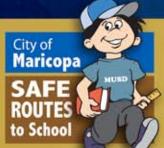


# SAFE ROUTES TO SCHOOL A Program Framework









May 6, 2008

Mr. Brent Billingsley, AICP Development Services Director City of Maricopa Post Office Box 610 Maricopa, Arizona 85239

Subject:

Safe Routes to School (SR2S) Program Framework

Dear Mr. Billingsley:

On behalf of PBS&J, I am pleased to deliver this final version of Maricopa's initial *Safe Routes to School: A Program Framework*. We commend your foresight in recognizing the many benefits of fostering a safe walking and bicycling environment for students and your tenacity in advancing that vision to reality.

Having reached a major milestone (*Moving Past Barriers*), the City and Maricopa Unified School District (MUSD) have laid the foundation for a long-term, comprehensive, and cooperative program of enhanced safety and physical activity for Maricopa's youth. With the enthusiasm and dedication demonstrated by the City, MUSD, and the community during this initial effort, I have no doubt that Maricopa will soon have one of the preeminent SR2S programs in Arizona.

Projects and programs that offer such measurable benefits to the community are very important to PBS&J on both the personal and professional levels. We are proud and honored to have been a participant in the inaugural activities of this SR2S Program. If we can be of further service as the Program moves forward, please do not hesitate to contact us.

Very truly yours,

Douglas M. McCants, PE, PTOE

Project Manager



# **Summary**

Today, fewer than 15 percent of all school trips are made by walking or bicycling, one-quarter are made on a school bus, and over half of all children arrive at school in private automobiles. This decline in walking and bicycling has had an adverse effect on traffic congestion and air quality around schools, as well as on pedestrian and bicycle safety.

### Federal/State Program Background

The purpose of the Federal Safe Routes to School (SR2S) Program is to address these issues head on. At its heart, the SR2S Program empowers communities to make walking and bicycling to school a safe and routine activity once again. The Program makes funding available for a wide variety of programs and projects, from building safer street crossings to establishing programs that encourage children and their parents to walk and bicycle safely to school.

The Federal SR2S Program is funded at \$612 million over five fiscal years (FY 2005-2009) and is administered by State Departments of Transportation (DOTs). Each State administers its own program and develops its own procedures to solicit and select projects for funding. The program establishes two distinct types of funding opportunities: infrastructure projects (engineering improvements) and non-infrastructure related activities (such as education, enforcement and encouragement programs).

# **Local Program**

The SR2S Program, as required by the recently passed Federal Transportation Bill the Safe, Accountable, Flexible, Efficient Transportation Equity

Act (SAFETEA-LU), is intended to benefit children in primary and middle schools (K-8). SR2S is about kids walking and biking to school: regularly, routinely, and safely. SR2S integrates elements of transportation, economics, health and physical activity, environmental awareness and safety into one program.

The City of Maricopa's SR2S program was initiated in 2007 with the formation of a SR2S Team and a successful ADOT grant application (*Moving Past Barriers*). This initial activity has included support to the Maricopa Unified School District (MUSD)





by a consultant who has conducted a bike/pedestrian system-wide assessment to actively promote walking and bicycling to students, and to identify infrastructure projects to make walking and bicycling safer in Maricopa. Further, the consultant has created a program logo and prepared this framework document to guide the City in the implementation of the local program.

The City and the SR2S Team have identified three primary goals for the local program:

- to improve walking and bicycling conditions and safety
- to increase physical activity
- to decrease air pollution

The City of Maricopa has formed a local SR2S Team which is made up of City staff, Maricopa School District employees, the Maricopa Police Department, the Maricopa Fire District, and others.

Maricopa SR2S Team					
Representative	Affiliation				
Mary Witkofski, LMSW, Chair	City (Finance)				
Tom Beckett	Maricopa Unified School District				
Michael Burns	City (Police)				
Eddie Rodriguez	City (Fire)				
Maria Billingsley	City (Community Services)				
Kellee Kelley	City (Development Services)				
Brent Billingsley, AICP	City (Development Services)				

From this point forward, the success of the SR2S Program in meeting the stated goals will require a variety of ongoing efforts on the part of the SR2S Team. This framework and the program as a whole are not static elements. Rather, they require continuing review, re-evaluation, and adjustment to meet the needs of the community.

# The Five Es - Key Components of a Successful Program

Communities use many different approaches to make it safer for children to walk and bicycle to school and to increase the number of children doing so. Programs use a combination of education, encouragement, enforcement and engineering activities to help achieve their goals. Another important element is evaluation, which is incorporated into each of these areas.

Because the needs of every community will be unique, each community or individual school may choose to emphasize different components to make



its program work. Regardless of the focus, safety is the first concern. This Framework provides information and strategies related to each of these five basic elements of a SR2S program.

### **Engineering Evaluation**

SR2S engineering evaluations focus on the built environment within a set radius of each school. For the City of Maricopa, the consultant utilized a one-mile radius as that represents the typical upper limit for walking or biking distance to school. The engineering evaluation provides a sound basis for:

- Identifying and regulating the school zone
- Providing and maintaining bicycle and pedestrian facilities along the school route
- Providing safe street crossings for bicyclists and pedestrians
- Calming traffic

Complementing the engineering evaluation, the consultant undertook a comprehensive survey of parents' attitudes toward walking/bicycling.

The consultant has compiled a series of recommendations for consideration by the City and MUSD:

- The City should adopt the signing and marking standards presented in ADOT's *Traffic Safety for School Areas Guidelines 2006* and/or the current MUTCD as the City standard. These include, but are not limited to:
  - Yellow crosswalk markings at designated school crossings
  - School speed zone locations and lengths
  - Locations of portable school zone signs
- To enhance visibility and draw greater attention to the school zones, the City should augment existing and future school area signing with the yellow-green fluorescent sign post covers.
- Upon its release (later in 2008), the City and MUSD should adopt the guidelines contained in ITE Technical Committee ReportTENC-105-0: School Site Planning, Design, and Transportation for the purposes of planning and designing future schools.
- As budgets permit, the City should upgrade the signing and pavement markings at existing schools in accordance with the proposed schemes provided in this report.



- MUSD should only locate portable signs in the street during times
  when crossing guards are present. Less desirably, portable signs
  may remain on collector and local streets for the duration of the
  school day.
- The City of Maricopa Police Department should continue to periodically review vehicle-student and vehicle-bike accident history to identify potential problem areas and notify the City's Development Services Director or SR2S Coordinator of those locations for further study.
- MUSD should provide and/or upgrade, as required, bicycle storage facilities at all elementary and middle schools.
- MUSD should evaluate the potential of providing additional access to the Maricopa Wells Middle School property along the eastern property line in an effort to encourage more bicycling and walking from the neighborhoods to the east and southeast of the school.
- The City and MUSD should add a pedestrian crossing and crossing guard as well as the requisite advance and portable signing at the intersection of Honeycutt and Terragona to encourage walking and bicycling from the neighborhoods south of Honeycutt, southeast of Santa Cruz Elementary.
- The City and MUSD should enthusiastically support the SR2S Program and participation therein by the community and students.

### Implementation Plan

A recommended initial implementation plan (including priorities, costs, and responsibilities) follows this summary. The implementation plan is not considered a static document; rather, it will need frequent updating to meet the specific needs and changing conditions of the community.

# **Planning for the Future**

As the City continues to grow and MUSD adds more schools, particular attention should be afforded site selection and layout relative to their impacts on walking and biking safety. This section of the Framework offers the City and MUSD some general guidelines for the selection of future school sites and the design of those schools.





# IMPLEMENTATION PLAN: PROJECTS, PRIORITIES, AND RESPONSIBILITIES

		Responsibility (■ Primary ■ Secondary)			Est.	Eligible	
Project Name (Applicable Es)	Priority	City (Dept)	MUSD	Other	Cost (\$000s)	for SR2S Funding?	Project Notes/Description
Enhanced Vehicle Speed Control in School Zones (Engineering & Education)	High	(Devel Svcs)			75	Yes	Driver speed feedback signing in high-infraction areas or approaches; staged installation over multiple budget years possible
Shortened Duration of In-Street Portable School Zone Speed Signs on Arterial Streets (Engineering & Encouragement)	High		•		NA	NA	Shortened duration of speed zoning will promote driver adherence; may be combined with School Zone Signing/Striping Standardization and Enhanced Vehicle Speed Control projects for maximum effectiveness
Enforcement of School Zone Speeds, Signing, and Other Regulatory Issues (Enforcement)	High	(Police & Devel Svcs)			UK	Yes / No	Ongoing effort; example strategies are summarized in Section 4 of the <i>Program Framework</i>
Ongoing Assessment of Walking/Biking Activity and Community Attitudes (Evaluation)	High	•	•		2/yr	No	Quarterly in-class and biannual parent surveys provide measures of success and community attitudes over time
Engineering Study Up- dates (Engineering)	High	(Devel Svcs)			5	Yes	Biannual engineering reviews of each school site ensure compliance with standards/recommended practices
School Zone Signing/Striping Stan- dardization (Engineering)	Medium	(Devel Svcs)	•		25	Yes	See "Proposed Signing & Striping" recommendations for each school in the February 2008 Engineering Study; includes yellow school crosswalks and high-reflectivity yellow-green signing and post covers; schools may be staged to spread expenditure over more than one budget year
Extended Walk/Bike to School Boundary at Santa Cruz Elementary (Engineering & Encour- agement)	Medium	(Devel Svcs)			3.5	Yes	Additional signing, pavement markings, and crossing guard at Honeycutt/Road/Terragona Boulevard; replaces some existing bus transport south of Honeycutt Road
Bicycle Storage Facilities at Santa Cruz Elementary (Encouragement)	Medium		•		10	Yes	Lack of storage facilities at this location limits stu- dent bicycling and inappropriate storage of those bicycles that are ridden to school
Walking/Bicycling Edu- cational Programs and Events (Education)	Medium	(Comm Svcs & Police)	•	•	UK	Yes	Ongoing effort; may be combined with other city/regional events/festivals; example activities are summarized in Section 4 of the <i>Program Framework</i> ; potential sponsorship by local service organizations or businesses







# IMPLEMENTATION PLAN: PROJECTS, PRIORITIES, AND RESPONSIBILITIES

Project Name (Applicable Es)	Priority	Responsibility ( Primary Secondary)			Est.	Eligible	
		City (Dept)	MUSD	Other	<b>Cost</b> (\$000s)	for SR2S Funding?	Project Notes/Description
Walking/Bicycling En- couragement Programs/Events (Encouragement)	Medium	(Comm Svcs & Police)		•	UK	Yes	Ongoing effort; may be combined with other city/regional events/festivals; example activities are summarized in Section 4 of the <i>Program Framework</i> ; potential sponsorship by local service organizations or businesses
Expanded Bicycle Storage Facilities at all MUSD Schools (Encouragement)	Low				20	Yes	Provision of safe and sufficient storage areas is critical to encouraging bicycling to/from school
Additional Bicy- cle/Pedestrian Access to Maricopa Wells Middle School (Encouragement)	Low		•		UK	Yes	Additional access along the eastern property line provides a shorter bicycle/pedestrian commute to/from the residential neighborhoods to the east and southeast; to reduce security concerns, consider access at this location only during short periods of time coincident with arrival and dismissal times





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Encouragement
Education
Enforcement
Evaluation

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### 6 Implementation Plan

Current and Past Implementation Plan

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The accompanying electronic media disc includes this complete Program
Framework document



# INTRODUCTION AND PURPOSE

# **Introduction and Purpose**

Recognizing the importance of pedestrian and bicyclist safety and the benefits of students walking and biking to school, the City of Maricopa, in cooperation with the Maricopa Unified School District (MUSD), initiated plans for a Safe Routes to School (SR2S) Program in 2007. Following a successful grant application (*Moving Past Barriers*) through the Arizona Department of Transportation (ADOT), the City initiated the first steps in the program development:

- Formation of a SR2S team that included representatives from the City, MUSD, police and fire departments, and citizens
- Selection of a consultant (PBS&J) to assist the team with
  - Engineering evaluation of current infrastructure and operations in the vicinity of existing schools
  - Assessment of community attitudes toward walking and biking to school
  - Development of an initial SR2S Program Framework (Framework)
  - Development of initial walk/bike-to-school maps for the existing schools

The *Framework* was formatted for insertion in a three-ring binder to promote the ease of future updates and to allow additional materials to be inserted.

The content of the *Framework* is intended to provide a basic resource to the City, MUSD, and others for the implementation and maintenance of the SR2S Program. While much material from external sources has been included here, the reader is invited to explore the wealth of SR2S resources available. Section 8 provides a starting point, with links to some of the most frequently used and comprehensive online resources.



# PROGRAM BACKGROUND AND GUIDANCE AT THE FEDERAL AND STATE LEVELS



# Program Background and Guidance at the Federal and State Levels

In 1969, about half of all students walked or bicycled to school<sup>1</sup> Today, however, the story is very different. Fewer than 15 percent of all school trips are made by walking or bicycling, one-quarter are made on a school bus, and over half of all children arrive at school in private automobiles.<sup>2</sup>

This decline in walking and bicycling has had an adverse effect on traffic congestion and air quality around schools, as well as pedestrian and bicycle safety. In addition, a growing body of evidence has shown that children who lead sedentary lifestyles are at risk for a variety of health problems such as obesity, diabetes, and cardiovascular disease.<sup>3</sup> Safety issues are a big concern for parents, who consistently cite traffic danger as a reason why their children are unable to bicycle or walk to school.<sup>4</sup>

### **Federal Program**

The purpose of the Federal Safe Routes to School (SR2S) Program is to address these issues head on. At its heart, the SR2S Program empowers communities to make walking and bicycling to school a safe and routine activity once again. The Program makes funding available for a wide variety of programs and projects, from building safer street crossings to establishing programs that encourage children and their parents to walk and bicycle safely to school.

The SR2S Program is a Federal-Aid program of the U.S. Department of Transportation's Federal Highway Administration (FHWA). The Program was created by Section 1404 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users Act (SAFETEA-LU). The SR2S Program is funded at \$612 million over five Federal fiscal years (FY 2005-2009) and is administered by State Departments of Transportation (DOTs).

The Program provides funds to the States to substantially improve the ability of primary and middle school students to walk and bicycle to chool

<sup>&</sup>lt;sup>4</sup> "Barriers to Children Walking and Biking to School," CDC, 2005.





<sup>&</sup>lt;sup>1</sup> "Transportation Characteristics of School Children," Report No. 4, Nationwide Personal Transportation Study, Federal Highway Administration, Washington, DC, July 1972.

<sup>&</sup>lt;sup>2</sup> Data from the 2001 National Household Travel Survey conducted by Federal Highway Administration were used as the source.

<sup>&</sup>lt;sup>3</sup> "Physical activity and the health of young people," U.S. Centers for Disease Control & Prevention, Fact Sheet, 2004.



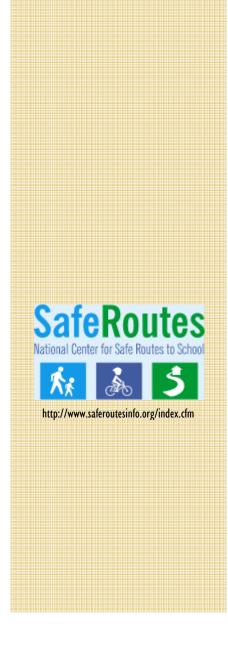
safely. The purposes of the program are:

- Enable and encourage children, including those with disabilities, to walk and bicycle to school
- Make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age
- Facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity (approximately 2 miles) of primary and middle schools (Grades K-8)

Each State administers its own program and develops its own procedures to solicit and select projects for funding. The program establishes two distinct types of funding opportunities: infrastructure projects (engineering improvements) and non-infrastructure related activities (such as education, enforcement and encouragement programs). More detail on eligible projects, as well as program set-up is provided in the SR2S Program Guidance document.

The legislation also specifically establishes several entities that are responsible for coordination and information distribution:

- <u>Safe Routes to School Coordinator</u>. Each State receiving funds is required to establish a full-time position of coordinator of the State's safe routes to school program. FHWA issued a Memorandum on September 26, 2005 with instructions regarding this position. Also refer to the FAQ section of this website for further guidance.
- National SR2S Clearinghouse. The FHWA will make grants to a
  national nonprofit organization engaged in promoting safe routes
  to schools to operate a National SR2S Clearinghouse, to develop
  information and educational programs on safe routes to school,
  and to provide technical assistance and disseminate techniques and
  strategies used for successful safe routes to school programs.
- Task Force. The FHWA will form a national SR2S Task Force composed of leaders in health, transportation, and education. The Task Force may include representatives from State and local agencies as well as relevant non-profit organizations and associations. The goals of the Task Force will be to study and develop a strategy for advancing safe routes to school programs nationwide. Congress has requested a report from the Task Force detailing the results of their work.







### **Arizona Programs**

ADOT will call for applications on an annual basis, generally during the first half of the school year. Applicants who submit incomplete applications or whose applications are not selected will not be notified. A prioritized list of projects recommended for funding will be compiled by ADOT's SR2S Advisory Committee and submitted to the Arizona Transportation Board for final approval

Mr. Brian Fellows, (Arizona Department of Transportation (ADOT)) serves as the State SR2S Program Coordinator.

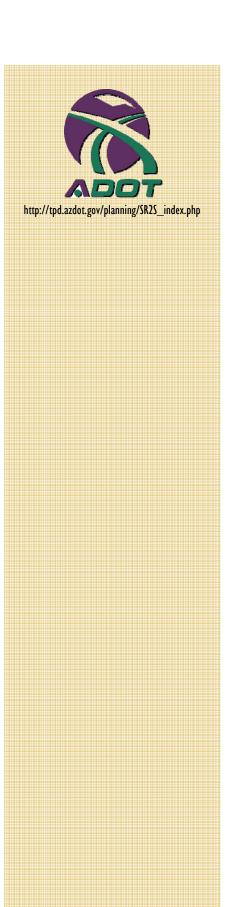
### **Infrastructure Projects**

These projects include the planning, design, and construction of infrastructure-related projects that will substantially improve the ability of students to walk and bicycle to school, including

- Sidewalk improvements
- Traffic calming and speed reduction improvements
- Pedestrian and bicycle crossing improvements
- On-street bicycle facilities
- Off-street bicycle and pedestrian facilities
- Secure bicycle and pedestrian facilities
- Traffic diversion improvements in the vicinity of schools (Section 1404(f)(1)(A))

Given the general guidelines established in the legislation, ADOT will be responsible for determining the specific types of infrastructure projects that are eligible for this program. Below is a list of potential infrastructure projects that have been used for existing SR2S or related programs. This list is not intended to be comprehensive; other types of projects that are not on this list may also be eligible if they meet the objectives of reducing speeds and improving pedestrian and bicycle safety and access.

- Sidewalk improvements; new sidewalks, sidewalk widening, sidewalk gap closures, sidewalk repairs, curbs, gutters, and curb ramps
- Traffic calming and speed reduction improvements: roundabouts, bulb-outs, speed humps, raised crossings, raised intersections, median refuges, narrowed traffic lanes, lane reductions, full- or half-street closures, automated speed enforcement, and variable speed limits







- Pedestrian and bicycle crossing improvements: crossings, median refuges, raised crossings, raised intersections, traffic control devices (including new or upgraded traffic signals, pavement markings, traffic stripes, in-roadway crossing lights, flashing beacons, bicyclesensitive signal actuation devices, pedestrian countdown signals, vehicle speed feedback signs, and pedestrian activated signal upgrades), and sight distance improvements
- On-street bicycle facilities: new or upgraded bicycle lanes, widened outside lanes or roadway shoulders, geometric improvements, turning lanes, channelization and roadway realignment, traffic signs, and pavement markings
- Off-street bicycle and pedestrian facilities: exclusive multi-use bicycle and pedestrian trails and pathways that are separated from a roadway
- Secure bicycle parking facilities: bicycle parking racks, bicycle lockers, designated areas with safety lighting, and covered bicycle shelters
- Traffic diversion improvements: separation of pedestrians and bicycles from vehicular traffic adjacent to school facilities, and traffic diversion away from school zones or designated routes to a school

Planning, design, and engineering expenses, including consultant services, associated with developing eligible infrastructure projects are also eligible to receive infrastructure funds.

### **Non-Infrastructure Projects**

These projects include education, enforcement, and encouragement efforts. Education efforts include teaching children about bicycling and walking safety skills, the health effects of walking and biking, the impact to the environment, the broad range of transportation choices, and events and activities that promote walking and biking to school safely. Enforcement efforts include ensuring that traffic laws are obeyed (including enforcement of speeds, yielding to pedestrians in crossings and proper walking and bicycling behaviors, and initiating community enforcement activities. Encouragement includes bike-, pedestrian, and school-related giveaways and other materials. Following are examples of these kinds of projects:



### Education

- Implementation/distribution of educational curricula in the classroom,
- Pedestrian safety field trips,
- Implementing/distributing interactive pedestrian/bicycle safety video game (ex: FHWA's "Safer Journey," National Safety Council's "Step to Safety".),
- Events and activities such as: bicycle rodeos, Walk and Bike to School Day activities, school assemblies, walking school buses, bike trains, etc.
- Substitute teachers to cover faculty attending SR2S events during school hours,
- Stipends for parent or staff coordinators; (typically to reimburse volunteers for materials and expenses needed for coordination and efforts; "Super-volunteer" pay is possible in rare cases.),
- Costs to employ a SR2S program manager to run a SR2S program for an entire city, county, or other area-wide division that includes numerous schools,
- Consultant costs (either nonprofit or for-profit) to manage a SR2S program, as described in previous bullet.

### • Enforcement

- Equipment and training needed for establishing a crossing guard program,
- Provide regular training for crossing guards,
- Law enforcement or equipment needed for enforcement activities,
- Targeted driver actions at crosswalks and intersections,
- Vehicle speed feedback signs (mobile only, subject to approval),
- Neighborhood watch programs,
- Photo enforcement.

### • Encouragement

- Mileage clubs
- Bicycle helmet giveaways and fitting







### **Planning Assistance Program**

The SR2S Planning Assistance Program is for small or resource-poor elementary and middle schools, school districts, non-profit organizations, and communities. State, local, and regional agencies, including non-profit organizations, that demonstrate an ability to meet the SR2S requirements, may apply for funding for schools that provide education for students between the kindergarten and eighth grade levels.

The intent of the program is to provide the applicant with technical resources needed to plan and implement their own SR2S projects. As a condition of the program, the applicant will apply for the next cycle of SR2S infrastructure or non-infrastructure funding.

This is not a program to improve school pick-up/drop-off areas for the benefit of cars and buses; This is not a program to construct only sidewalks. All of the benefits of the variety of programs and projects ultimately recommended by the applicant (or its consultant) will be for the safety and walking/biking convenience of elementary and middle school students.

If an application is selected, ADOT will enlist the services of a consultant for the applicant The consultant may recommend that the applicant receive some of the following services:

- Conduct site/needs assessments of school areas.
- Develop school walking and bicycling route plans and maps,
- Recommend infrastructure solutions and locations,
- Recommend and provide guidance for non-infrastructure solutions,
- Develop school bicycle/pedestrian education, enforcement, encouragement programs,
- Conduct pre- and post- program/project evaluations,
- Conduct Safe Routes To School training sessions and community meetings,
- Provide grant writing assistance for next SR2S grant application

### Materials and Regional Support Program

The Materials and Regional Support Program (MRSP) is part of the SR2S Program and, as such, shares its program outcomes and comprehensive nature.



MRSP was created in order to serve state, regional, and local government agencies, as well as registered 501(c)3 non-profit organizations that demonstrate an ability to meet the SR2S requirements). These entities may apply for funding for programs that benefit elementary and middle school students in grades K-8.

The intent of the program is twofold:

- Provide funding for purchasing educational and encouragement materials for use in regional, countywide, or school district wide Safe Routes To School efforts, and/or
- Provide funding for statewide, countywide, or school district wide workshops relating to Safe Routes To School

The applicant may apply for funding for any combination of the above. However, the applicant may not apply for MRSP funding and SR2S funding for the same items during the same grant cycle.

Examples of Eligible MRSP Activities (all activities must be statewide, countywide, school district wide, or otherwise regional is scope):

- Design/implement/distribute educational curricula for the classroom
- Provide educational materials to parents, school staff, neighbors, or drivers
- Develop a SR2S media campaign
- Provide materials or hold training for crossing guards or law enforcement professionals
- Purchase, distribute, and fit bicycle helmets
- Purchase and distribute other Safe Routes To School-eligible giveaway items
- Provide training related to any of the above







# **Local Program**

### **Background**

The SR2S Program, as required by the recently passed Federal Transportation Bill the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU), is intended to benefit children in primary and middle schools (K-8). SR2S is about kids walking and biking to school: regularly, routinely, and safely. SR2S integrates elements of transportation, economics, health and physical activity, environmental awareness and safety into one program.

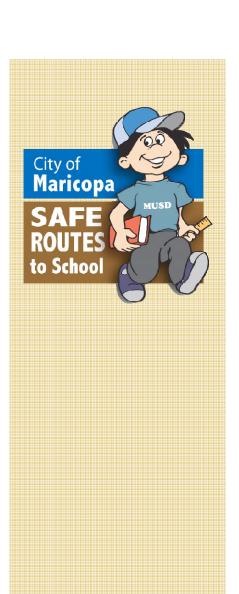
The City of Maricopa's SR2S program was initiated in 2007 with the formation of a SR2S Team and a successful ADOT grant application (*Moving Past Barriers*). This initial activity has included support to the Maricopa Unified School District (MUSD) by a consultant who has conducted a bike/pedestrian system-wide assessment to actively promote walking and bicycling to students, and to identify infrastructure projects to make walking and bicycling safer in Maricopa. Further, the consultant has created a program logo and prepared this framework document to guide the City in the implementation of the local program.

### Goals

The City and the SR2S Team have identified three primary goals for the local program:

- to improve walking and bicycling conditions and safety
- to increase physical activity
- to decrease air pollution

SR2S programs are part of the solution to increase physical activity, improve unsafe walking and bicycling conditions, and improve air quality. The school setting provides an unique opportunity to create an environment that encourages walking and bicycling as a way to travel to and from school and, especially for walking, as an activity during the school day. This holds the potential to reach the vast majority of children who regularly attend and must travel to school. Walking does not require special skills or expensive equipment, which makes it feasible for most of the population. School-based walking programs have the potential to address several of the most commonly cited barriers to physical activity, including motor vehicle traffic dangers and lack of a safe environment. Walking and bicycling to and from school can contribute towards the development of a lifelong habit and a community-wide norm of





incorporating physical activity into daily routines. Children who walk to school are more physically active overall than those who travel to school by motor vehicle, although the journey to school itself contributed relatively little. More specifically, studies have shown that increased physical activity for children increases concentration, improves mood and ability to be alert, improves memory and learning, and enhances creativity.

### **Administration and Participation**

The City of Maricopa has formed a local SR2S Team which is made up of City staff, Maricopa School District employees, the Maricopa Police Department, the Maricopa Fire District, and interested Maricopa citizens.

Maricopa SR2S Team					
Representative	Affiliation				
Mary Witkofski, LMSW, Chair	City (Finance)				
Tom Beckett	Maricopa Unified School District				
Michael Burns	City (Police)				
Eddie Rodriguez	City (Fire)				
Maria Billingsley	City (Community Services)				
Kellee Kelley	City (Development Services)				
Brent Billingsley, AICP	City (Development Services)				

City staff have worked with the SR2S Team as they implemented the initial SR2S grant-funded program activities.

## **Program Initiation**

The City of Maricopa announced the SR2S Program and unveiled the program's logo on November 15, 2007 via a widely distributed press release. That announcement was followed by two events aimed at introducing the program and its purpose/goals to the community.

**MUSD Leadership Team Presentation.** A short presentation was made on November 1, 2007 to the members of the MUSD Leadership Team. The foci of that presentation were the reasons that a SR2S Program is so vital to the community and to stimulate educator interest in and commitment to the program.

**Public Open House.** A public open house was held on December 5, 2007 at which attendees were offered both a formal presentation and an opportunity to interact one-on-one with members of the SR2S Team.

The Program Framework
electronic media includes the
complete MUSD PowerPoint
presentation





Comments on the program were solicited both verbally as well as via written comment cards.

The SR2S Team and the consultant then began work on the initial Moving Past Barriers project. The purposes (or sub-goals) of this effort included:

- Provide a road map for SR2S program that incorporates the 5 Es (engineering, education, encouragement, enforcement, and evaluation).
- Formalize procedures for developing, maintaining, modifying, and evaluating the program.
- Establish a timeline for recommended infrastructure and operational improvements.
- Ensure that City and MUSD safety improvements make the most effective and efficient use of available dollars.

The culmination of this initial activity is the completion of this Program Framework (and the included engineering study and implementation plan).

### **Recurring Activities**

From this point forward, the success of the SR2S Program in meeting the stated goals will require a variety of ongoing efforts on the part of the SR2S Team. This framework and the program as a whole are not static elements. Rather, they require continuing review, re-evaluation, and adjustment to meet the needs of the community.

After the program begins, careful monitoring will identify which strategies are increasing the number of children safely walking and bicycling to school. Proper adjustments can be made as this and other new information is gathered. One simple evaluation measure is to re-count the number of walkers and bicyclists and compare this number to the findings before the program began. Additional information on evaluating the effectiveness of the program is provided in Section 4 of this framework.

The SR2S Team also needs to consider how to sustain energy and interest in the program so that children continue to walk and bicycle to school safely. Key strategies for keeping the program going include:

- <u>Identifying additional program champions</u>.
- <u>Letting people know about the successes.</u> Get visibility for activities through local media and school communications and

The Program Framework electronic media includes the complete Open House PowerPoint presentation, display board images, and welcome brochure.



publicize your activities. Making the work fun and positive makes it more likely that people will want to continue and others will want to become involved.

- Encouraging policy changes. These might be school, school district or local government policies that support children walking and bicycling to school. For example, local planning departments may promote new school construction within walking and bicycling distance of residential areas. School district adoption of a safety curriculum means that the pedestrian and bicycle education will continue to be provided to children.
- <u>Creating a permanent committee.</u> A permanent committee within the PTA, school site council, or other group means that SR2S will continue to receive attention and energy.

A SR2S program has the potential to improve walking and bicycling conditions near a school and spread interest into other parts of the community. SR2S Teams that persist in their efforts and make measurable improvements based on their evaluation will be rewarded with safer places for children to walk and bicycle and more children choosing safe routes to school.



Recurring SR2S Program Activities						
Activity	Frequency					
ADOT SR2S Grant Applications	Annually or as otherwise announced by ADOT					
Incorporate new schools into the SR2S program	Immediate inclusion of private schools and addition of new public and private schools as they are constructed					
In-class student surveys	Quarterly, or more frequently, as required by grant requirements					
Parent surveys	Within the first year of each new public/private school being added to the program; otherwise, every other year at each school					
Incorporation of the ITE school site guidelines into this Framework	Upon public issuance of guidelines by ITE					
Application of ITE school site selection and layout guidelines	Commencing with the initial identification of the need for a new school and throughout the planning/design of the school					
On-site review of traffic control measures in the vicinity of schools	Every year, or more frequently if there are significant changes in the transportation network, traffic volumes, increased accidents, citizen/school complaints, etc.					
SR2S Team meetings	Quarterly, or more frequently as required					
Incorporation of findings of engineering studies (see Section 5)	As soon as practical and in accordance with the prioritized implementation plan					
Update existing (or conduct new) engineering studies	Every other year					
Evaluation of the success of SR2S program elements	Ongoing with annual summary reports					
Implementation of specific measures or activities to address each of the 5 Es	At a minimum, at least once activity annually each for engineering, encouragement, and education					
Finalize and implement an enforcement plan or strategies	As practical given personnel and resource availability					





# The Five Es – Key Components of a Successful Program

Communities use many different approaches to make it safer for children to walk and bicycle to school and to increase the number of children doing so. Programs use a combination of education, encouragement, enforcement and engineering activities to help achieve their goals. Another important element is evaluation, which is incorporated into each of these areas.

Because the needs of every community will be unique, each community or individual school may choose to emphasize different components to make its program work. Regardless of the focus, safety is the first concern. The following sections provide information related to these five basic elements of a SR2S program. Much of the information presented here has been extracted from the *Safe Routes to School Guide*.<sup>1</sup>

### **Education**

Education is one of the complementary strategies in a Safe Routes to School (SR2S) program. Education activities include teaching pedestrian, bicyclist and traffic safety and creating awareness of the benefits and goals of SR2S. While education dovetails with engineering and enforcement, it is most closely linked to encouragement strategies. For example, children may learn pedestrian and bicyclist safety skills and then get the chance to join a mileage club that rewards children for walking or bicycling to school. Encouragement activities also offer "teachable moments" to reinforce pedestrian and bicyclist safety education messages.

Before beginning encouragement strategies, children should receive pedestrian and bicyclist safety education. Sometimes education strategies need to begin quickly. For example, in areas with unsafe routes where children are already walking or bicycling out of necessity, education is urgently needed to reduce the risk of injury to children until other measures can also be put into place. The timing for education activities can also depend on the issues in the community and how education fits with other parts of the SR2S program.

The Program Framework electronic media includes the complete Safe Routes to School Guide

Education activities target parents, neighbors and other drivers in the community to remind them to yield to pedestrians, to drive safely and to take other actions to make it safer for pedestrians and bicyclists. Parents serve as role models for their children and play an important part in teaching them pedestrian and bicycle safety. Education activities also teach students how to walk and bicycle safely and the benefits of doing so.

<sup>&</sup>lt;sup>1</sup> Safe Routes to School Guide, developed by the Pedestrian and Bicycle Information Center (PBIC) with support from the National Highway Traffic Safety Administration (NHTSA), Federal Highway Administration (FHWA), Centers for Disease Control and Prevention (CDC) and Institute of Transportation Engineers (ITE); February 2007.



### **School-based Education**

This section focuses on the delivery of education through the school because:

- While ideally children receive most of their instruction from parents, this does not always happen. School-based education assures that all children get the chance to learn and practice the same skills.
- All children can benefit from learning bicycle and pedestrian safety behaviors, regardless of whether they will walk and bicycle to school, as these skills will serve them throughout life.
- The reality in some communities is that young children who would ideally be supervised by adults are walking to school alone, which makes providing safety education and other strategies all the more important.

### When to Teach

A challenge with providing safety education in the schools is that children, even in the same grade, vary in their readiness to handle traffic situations, such as choosing a safe time to cross a street. In general, children are not ready to cross a street alone until age 10. 4 Ideally parents are a central figure in their children's safety education. Parents have the best opportunities to effectively assess their individual child's skills and teach safe behavior in the course of daily life so they should be encouraged to participate in their child's safety education. It is also important to emphasize to children that they need to check with their parents before walking or bicycling alone. Children may believe that because they have been taught how to cross a street, for example, that they are ready to do so on their own.

### Key Messages For Children

The four main education topics that relate to Safe Routes to School (SR2S) for children are:

- Pedestrian safety skills
- Bicyclist safety skills
- Personal safety
- Health and environment benefits

Specific strategies for each of these topics are provided in Chapter 6 of the SR2S Guide.











### **Parents**

Education directed towards parents can strongly influence whether more children walk and bicycle to school in a safe manner. Parents control whether their child walks or bicycles to school and how their child behaves during these activities. A parent's own behavior also impacts the safety of his or her child and all children as they walk or bicycle to school. For example, a parent who speeds to drop off his or her child at the school makes a less safe environment for walkers and bicyclists. Parents who walk with their children to school can provide supervision and guidance for children who are learning how to negotiate traffic and people in their environment.

### **Key Messages For Parents**

In relation to Safe Routes to School (SR2S), parents play a role in their child's safety in three ways:

- As teachers of safety behaviors.
- As drivers on the school campus during drop-off and pick-up times.
- As drivers near the school.

### Strategies For Reaching Parents

A variety of strategies can be used to reach parents as they teach their children safety skills and drive on the school campus and adjacent streets.

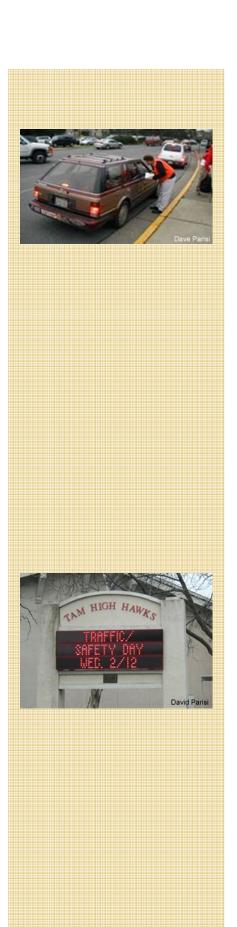
**Print materials.** To communicate with parents, school Web sites, e-mails to parents or information sent home with students can all be used. In California, some schools hold Traffic Safety Days to promote safe driving in the school zone, as well as encourage safe walking and bicycling. School officials, parent volunteers, law enforcement officers and others distribute fliers and talk to drivers who pick up or drop off children. Walkers and bicyclists are given safety information and incentives at a welcome table as they arrive at the school.

**Enforcement strategies.** Signs, pavement markings, notices and educational flyers placed on windshields of illegally parked motor vehicles remind parents of proper rules and procedures. See the Enforcement chapter for more information.

Media stories. Local news stories that focus on Safe Routes to School (SR2S) can also include key messages about pedestrian, bicyclist and traffic safety.

Training. While many parents feel comfortable teaching their child pedestrian safety, they sometimes feel less prepared to teach bicycling rules





of the road. One bicycle club in Marin County, California, responded to this need by offering a training class for parents on how to teach bicycling skills to their children. Some communities have sought ways to improve parents' driving behavior through training.

### **All Drivers Near the School**

Many parents, community members and school personnel drive near the school on most weekdays. Each driver can contribute to or detract from the safety of the walking and bicycling environment for children. Failure to comply with traffic laws and posted speed limits are examples of driving behaviors that result in unsafe conditions.

The need to reduce the number of speeders and the speeds at which they travel is crucial to ensure the routes to school are safe. Along with speeding, failure to comply with stop signs and traffic signals also contributes to unsafe environments. Drivers traveling at safe speeds, yielding to pedestrians and bicyclists, and stopping at stop signs and crosswalks help create a pedestrian and bicyclist-friendly environment.

### Key Messages For Drivers Near the School

Drivers near the school can help create an environment that feels safe and inviting for pedestrians and bicyclists. They need to know the following:

- Watch for, and yield to, pedestrians and bicyclists near and around the school
- Obey speed limits for the school zone
- Come to a complete stop at stop signs
- Do not block pedestrian crosswalks

### Strategies For Reaching All Drivers Near the School

A good time to provide safety messages to drivers is while they are in their motor vehicles and near the school, through signage, enforcement strategies and media.

### **Neighbors**

Neighbors include residences and businesses near the school. The success of a Safe Routes to School (SR2S) program can be influenced by neighbors who can either play an active role in making it safer for children to walk and bicycle to school or resist these efforts. While some neighbors have children who attend the school, many do not. Addressing their needs and concerns and involving them in the SR2S process will increase the odds that they will be supportive.





### **Key Messages For Neighbors**

Messages to neighbors depend on local conditions. If there are environmental barriers to safe walking routes, often the neighbors can help.

Messages for neighbors include:

- Keep sidewalks clear so they are passable by pedestrians. Sometimes motor vehicles, garbage cans, snow and other materials force pedestrians off of walkways and into traffic.
- Prune plants and shrubs to enhance visibility. This will help pedestrians, bicyclists and drivers see one another, particularly at street crossings.
- Keep unleashed pets off the route. A loose animal can be intimidating and deter walking or bicycling, regardless of the friendliness of the animal.

### Strategies For Reaching Neighbors

Neighbors should be engaged early in the SR2S planning process. This provides an opportunity for SR2S coordinators to hear and address these concerns and increases the likelihood that neighbors will take action to make or keep routes safe. The impact of potential SR2S activities on neighbors should be assessed. For example, a remote drop-off area may be initiated to ease traffic congestion near the school. While it improves safety for pedestrians and bicyclists and gives those that live further away the chance to walk, it may also create traffic problems in new areas. Identifying and addressing these issues need to be part of the process.

### **Encouragement**

Encouragement strategies are about having fun; they generate excitement and interest in walking and bicycling. Special events, mileage clubs, contests and ongoing activities all provide ways for parents and children to discover, or rediscover, that walking and bicycling are do-able and a lot of fun.

Encouragement is one of the complementary strategies that Safe Routes to School (SR2S) programs use to increase the number of children who walk and bicycle to school safely. In particular, encouragement and education strategies are closely intertwined, working together to promote walking and bicycling by rewarding participation and educating children and adults about safety and the benefits of bicycling and walking.



Encouragement strategies generate excitement about walking and bicycling safely to school. Children, parents, teachers, school administrators and others can all be involved in special events like International Walk to School Day and ongoing activities like walking school buses. Encouragement strategies can often be started relatively easily with little cost and a focus on fun.



Encouragement activities also play an important role moving the overall SR2S program forward because they build interest and enthusiasm, which can buoy support for changes that might require more time and resources, such as constructing a new sidewalk.

In brief, encouragement activities:

- Can be quick and easy to start
- Can be done with little funding
- Can be organized by parents, students, teachers or volunteers
- Focus on fun and enjoyment
- Jumpstart a community's interest in walking and bicycling
- Show quick success and generate enthusiasm for other strategies that may require a greater investment of time and resources
- Can foster safe walking, bicycling and physical activity behaviors that will be useful throughout children's lives
- Offer teachable moments to reinforce safe walking and bicycling behaviors

There are many encouragement strategies that will be described in this chapter, such as Walk to School Days, when the whole school is invited to take one day off from their usual routine to join in the parade of children walking and bicycling to school. Walking school buses and bicycle trains are organized efforts that group children with adults for safety and for fun while contests help to encourage students to walk or bicycle by offering rewards and recognition.

### **Special Events**

A special event is usually a one-day activity to celebrate walking and bicycling to school. Most often, families walk or bicycle from home or from a group meeting area. Signs, balloons and banners can be used to create an air of excitement and celebration. When they arrive at the school, participants might be greeted by the school principal or a school mascot and receive snacks and small gifts like stickers. A press conference, songs, flag salute or other group activity round out the event.

Volunteers help plan the event, walk with children and give out items at the school. These events offer the added benefits of bringing visibility to Safe Routes to School (SR2S) and related issues as well as educating families and the broader community about the benefits and joy of walking and bicycling safely to school. They may be held once a year, such as International Walk to School Day, or several times during the year.









International Walk to School Day, held in October each year, joins children and adults from around the world to celebrate walking and bicycling to school. This event can be a fun way to kick off an SR2S program. In fact, many participating communities use the event to work towards creating safe environments that support walking and bicycling every day.

Since it began in the United States in 1997, participation, both within the United States and in other countries, has grown every year. The event's popularity led to the establishment of October as International Walk to School Month, giving communities the flexibility to celebrate on a single day, week or throughout the month. Information about how to register for and plan a local event can be found at www.walktoschool.org.

### Mileage Clubs and Contests

Mileage clubs and contests encourage children either to begin walking and bicycling to school or to increase their current amount of physical activity by making it fun and rewarding. Generally children track the amount of miles they walk or bicycle and get a small gift or a chance to win a prize after a certain mileage goal is reached.

Mileage clubs and contests are usually designed in one of three ways:

On an individual basis where every child logs miles walked or bicycled and has a chance to win.

- As a classroom competition where a classroom's collective miles are compared against other classes.
- As a competition among schools.
- Winners are rewarded with prizes including medals, certificates or trophies.

These activities are very flexible. Depending on the school, the competition aspect can be emphasized or not, and the rewards can be elaborate or simple. In rural areas or other places where the route to school is unsafe or difficult to walk or bicycle, the activity can be modified by providing credit for distance walked and bicycled at home, to and from a bus stop, or during the school day on campus.

Mileage clubs and contests usually involve incentives like prizes or small gifts. In order to be most effective, incentives need to be provided in concert with other strategies over a period of time, not just given once.

### **Ongoing Activities**

Ongoing walking and bicycling activities are defined here as activities that







are held daily, weekly or several times per month throughout the school year. Walking school buses, bicycle trains, park and walk activities and routine on-campus walks all are ongoing encouragement activities. When planning, some schools choose more than one encouragement activity and include opportunities for children that cannot walk or bicycle the route to school from their home. See the end of this section for examples of how two schools created comprehensive, inclusive encouragement campaigns.

### Walking School Buses and Bicycle Trains

A walking school bus and bicycle train both consist of groups of students accompanied by adults that walk or bicycle a pre-planned route to school. Routes can originate from a particular neighborhood or, in order to include children who live too far to walk or bicycle, begin from a parking lot. They may operate daily, weekly or monthly. Often, they are started in order to address parents' concerns about traffic and personal safety while providing a chance for parents and children to socialize.

Walking school buses and bicycle trains can be loosely structured or highly organized. For example, walking buses or bicycle trains can be as simple as neighborhood families deciding to walk or bicycle together. More formal, organized walking school buses and bicycle have a coordinator who recruits volunteers and participants, creates a schedule and designs a walking route. While requiring more effort, more structured walking school buses and bicycle trains offer the opportunity to involve more children.

### Park and Walk

A pre-determined parking lot acts as the meeting area for families who drive and then park and walk the remaining distance to school. Some communities require parents to walk with their children to school while others have designated adult volunteers to walk groups of children from the parking area to school.

Park and walk campaigns have the potential to reduce traffic congestion around a school and encourage physical activity for parents and children. This strategy is especially helpful for including families who live too far from the school to walk or who do not have a safe route to school

### **On-campus Walking Activities**

In rural areas or other places where it is unsafe or difficult to walk to school, communities can encourage walking on the school campus. For example, school officials can establish walking activities before or after school or during recess, physical education or health class. Walk routes on the school grounds provide all students an opportunity to walk a safe









route and increase their physical activity. Ideas presented in the Mileage Clubs and Contests section also provide suggestions for incorporating routine walking into the school day.

### **Enforcement**

The main goal for SR2S enforcement strategies is to deter unsafe behaviors of drivers, pedestrians and bicyclists, and to encourage all road users to obey traffic laws and share the road safely. Enforcement is one of the complementary strategies that SR2S programs use to enable more children to walk and bicycle to school safely. But enforcement used alone will not likely have a long-term effect. Communities must utilize a combination of enforcement, engineering, education and encouragement strategies to address the specific needs of their schools and achieve long-term results.

The public typically thinks of enforcement as officers writing tickets. In fact, enforcement, especially for SR2S programs, is a network of community members working together to promote safe walking, bicycling and driving. This can be accomplished through safety awareness, education and, where necessary, the use of ticketing for dangerous behaviors. Enforcement includes students, parents, adult school crossing guards, school personnel and neighborhood watch programs all working in conjunction with law enforcement. Working together to enforce rules for safe walking, bicycling and driving makes it safer and easier for everyone to walk and bicycle.

### **Identifying Unsafe Behaviors**

Enforcement programs start with identification of the unsafe behaviors of drivers, pedestrians and bicyclists around the school. Then appropriate strategies for improving these behaviors can be selected. There are many ways to identify unsafe behaviors; an observation of student arrival and departure from school is a good way to start. Speed measurements and examination of recent crash reports near the school provides additional information. Look for the common unsafe behaviors listed below when observing traffic around a school.

### **Driver Behaviors**

Unsafe driver behaviors occur both on the route to the school and on the school campus. Unsafe driver behaviors on the streets around the school include:

• Speeding through residential streets and school zones. (Speed is directly related to crash frequency and severity.)

Enforcement activities can help to change unsafe behaviors of drivers, bicyclists and pedestrians. They can increase driver awareness of laws, and they also can improve driver behavior by reducing speeds and increasing yielding to pedestrians. In addition, enforcement activities teach pedestrians and bicyclists to walk and bicycle safely and to pay attention to their environment. Enforcement doesn't just involve law enforcement. Many different community members take part in making sure everyone follows the rules, including students, parents, school personnel and adult school crossing guards. In addition, the role of the law enforcement officers often goes beyond enforcement and can be included in all strategies of the SR2S program.









- Failing to yield to students walking or bicycling, especially in crosswalks. (The law requires drivers to stop for pedestrians in crosswalks; it's a law that is often ignored.)
- Running red lights or stop signs.
- Passing stopped school buses.
- Parking or stopping in crosswalks.

### Speed Matters

Some drivers don't think about the risks they create. A driver may not think going 10 mph over the speed limit will be noticeably less safe, but just a 10 mph difference in speed can be critical to whether a pedestrian lives or dies when struck by a motor vehicle. This is especially true for children and older pedestrians. At 0 mph, a pedestrian has about a 5 percent chance of dying if he is hit by a motor vehicle. At 30 mph, the chance of dying increases to roughly 45 percent. If a pedestrian is hit by a motor vehicle traveling 40 mph, the risk of dying increases to 85 percent.

Frequently, speeding problems near schools are related to the school itself. Often the parents and staff from the school are the speeders. Unsafe driver behaviors on the school campus typically involve student drop-off or pick-up. These include:

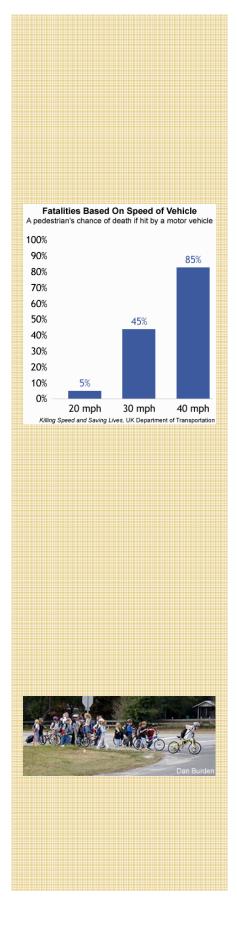
- Illegal parking.
- Motor vehicles stopping in a bus zone.
- Dropping off students in the street rather than in the appropriate location adjacent to the curb.
- Drivers letting students walk between parked motor vehicles and buses.
- Violating school drop-off and pick-up procedures.

### Pedestrian and Bicyclist Behaviors

Another critical component of enforcement activities is making sure that children and other pedestrians and bicyclists know and follow the safety rules. Efforts should focus on students' behavior on the route to school in order to minimize the risks that student pedestrians and bicyclists may encounter.

Unsafe pedestrian behaviors include:

 Not following the directions of the crossing guard or traffic signals.







- Not looking left, right and left again before crossing the street.
- Crossing a street at an undesirable location.
- Darting out between parked vehicles.
- Wearing dark clothes when there is poor lighting.
- Unsafe bicyclist behaviors include:
- Riding into traffic without looking left, right and left again.
- Riding against traffic instead of with the traffic flow.
- Turning left without looking and signaling.
- Not obeying traffic signs and signals.
- Riding out from driveway or between parked vehicles
- Not wearing bicycle helmet.
- Not being visible at night when riding in road.

# Role of the Enforcement Officer

Law enforcement officers see first hand the consequences of motor vehicle crashes. They also see first hand the behaviors that cause these consequences. From conducting education and enforcement campaigns to identifying unsafe conditions, law enforcement officers can play multiple roles in Safe Routes to School (SR2S) programs.

Demands on a police department and the level of participation departments can offer varies from community to community. It is important to understand what the local law enforcement resources are. For some communities, law enforcement resources must be reserved for situations where students face harm or when unsafe behaviors persist despite the use of other methods.

State police or highway patrols, sheriff departments and local law enforcement agencies all may be partners in the program. There are at least three general types of law enforcement officers that typically assist SR2S efforts:

# Traffic Enforcement Specialists

These officers are assigned to specialize in traffic enforcement. They respond quickly to traffic safety hot-spots.

# Community Action Officers (CAOs)/Precinct Officers

These officers are generally assigned to a specific portion of the city and work on problem areas. While they do not specialize in traffic





enforcement, they can be called in for enforcement activities at the start and end of school days and help coordinate with motor officers.

## School Resource Officers (SROs)

Some law enforcement officers are assigned to schools and concentrate on special problems such as drugs, gangs, and other on-campus problems. They can also be used to help solve special traffic problems on or near the campus and can coordinate with the motor officers and CAOs.

Officers can serve in the following ways:

- Teach safety issues to children, school officials, parents and the community.
- Evaluate local traffic concerns, observe problem areas and behaviors, and provide input about safe routes.
- Provide an enforcement presence that discourages dangerous behaviors on and off the school campus. This may mean issuing warnings to drivers breaking traffic laws. Drivers who have made a minor error will often respond to a warning from an officer by being more careful. Drivers who continue to violate traffic laws need to be ticketed.
- Monitor crossing guards and make sure they are acting safely in the street and are not taking chances or over-stepping their duties as guards.
- Monitor students to ensure that they cross at safe locations and do not take unnecessary risk

# The Community Enforcement Approach

Representatives of communities and schools can improve safety behaviors in many ways. Older students can become safety patrol members and help during drop-off and pick-up times at the schools. Adults can volunteer to become crossing guards to enforce safe behaviors at crossings. Neighborhood speed watch programs can provide opportunities for residents to educate drivers about their driving speeds while making drivers aware that the neighborhood is concerned about safety. All adults in a community need to set good examples for their children and others by crossing streets in crosswalks when they are available and following other traffic rules.

# Safety Patrols

Student safety patrols enhance enforcement of drop-off and pick-up procedures at school by increasing safety for students and traffic flow





efficiency for parents. Such efforts allow students to participate in promoting traffic safety where they learn skills they can use in their everyday lives. Having a student safety patrol program at a school requires approval by the school and a committed teacher or parent volunteer to coordinate the student trainings and patrols. Before beginning a program, school officials should be contacted for approval of the program and to determine how liability issues will be addressed.

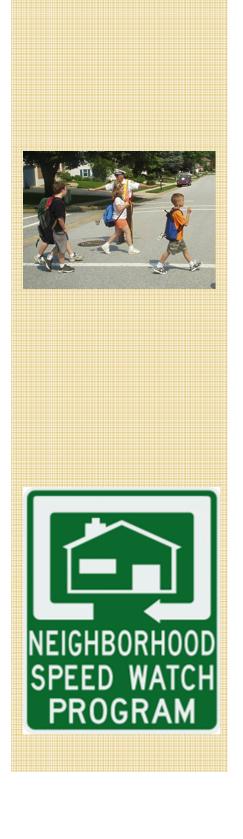
Students who are chosen for safety patrol officers are in good company. Past safety patrol officers include current members of the U.S. Supreme Court, as well as former presidents Bill Clinton and Jimmy Carter.

# Adult School Crossing Guards

Adult school crossing guards can play a key role in promoting safe driver and pedestrian behaviors at crosswalks near schools. They help children safely cross the street and remind drivers of the presence of pedestrians. A guard helps children develop the skills to cross streets safely at all times. Adult school crossing guards can be parent volunteers, school staff or paid personnel. Annual classroom and field training for adult school crossing guards as well as special uniforms or equipment to increase visibility are recommended, and in some locations required. The presence of guards can lead to more parents feeling comfortable about their child walking or bicycling to school. For more information see the Adult School Crossing Guard Guidelines (which can be viewed or downloaded at <a href="http://www.saferoutesinfo.org/guide/crossing guard/index.cfm">http://www.saferoutesinfo.org/guide/crossing guard/index.cfm</a>), which were developed by the National Center for Safe Routes to School and the Pedestrian and Bicycle Information Center with funding from the National Highway Traffic Safety Administration.

#### Neighborhood Speed Watch Programs

Neighborhood speed watch programs, a traffic-related variation of a neighborhood watch or crime watch, encourage citizens to take an active role in changing driver behavior on their neighborhood streets by helping raise public awareness and educate drivers about the negative impact of speeding. In these programs, residents record speed data in their neighborhood using radar units borrowed from a city or county law enforcement agency. Residents record the speed and license plate information of speeding motor vehicles. This information along with a letter is sent to the owner of the vehicle informing them of the observed violation and encouraging them or other drivers of their vehicle to drive at or below the posted speed limit. This type of awareness encourages some speeding drivers to slow down. Drivers also learn that residents will not tolerate speeding in their neighborhoods.







The organization of neighborhood speed watch programs can vary. Some jurisdictions have "Citizen's Patrol" elements in the police department and others have neighborhood volunteers to oversee the program.

# The Law Enforcement Approach

The previous sections summarized ways that the school and neighborhood can work together to improve safety behaviors. This section looks specifically at what only the law enforcement officer can do.

Law enforcement includes a variety of methods that use both technology and personnel to raise awareness and educate drivers about their driving behaviors and how they relate to the safety rules. An effective law enforcement program is more about providing visible police presence for improved behavior than writing a lot of tickets. The intent of enforcement is to get people to change dangerous behaviors that could cause a crash and subsequent injury or fatality. However, for some dangerous behaviors, enforcement activities need to be implemented early. For example, giving citations for exceeding the speed limit, even by 5 to 10 mph, is especially important in school zones since driving speed increases the likelihood of being severely injured or killed if struck by a vehicle.

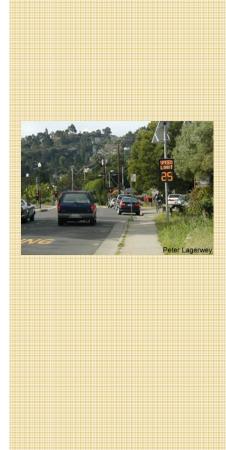
Effective Safe Routes to School Law Enforcement has three basic steps

**Involve parents and the community.** Generally, most of the traffic around schools is made up of neighborhood residents, parents of students, and the school's faculty and staff. An effective program will seek to notify all groups that a strong traffic law enforcement program is beginning.

Use public awareness and education first. Public awareness and education needs to occur before law enforcement activities. The awareness and education messages should inform people of the problem and why enforcement action is needed. This will generate public support and help to offset any complaints from those who are caught breaking the law. The public next needs to be told what the enforcement activities will be and when they will start. Methods for raising awareness include sending flyers home with students, mailing materials to residents living and using local television stations and newspapers to spread the message. Portable speed limit signs and speed reader boards are effective tools for providing real time speed information to drivers. For some drivers, raising that awareness may be enough to cause them to alter their unsafe actions.

**Provide officer training.** Officer training is critical to an effective law enforcement program. The training should include information on what, when, where and how law enforcement should occur to maximize behavior change and to reduce the number of crashes involving pedestrians.





#### The Media's Role in Enforcement Efforts

All the components of a good law enforcement program — creating awareness, alerting the public and the actual enforcement event — benefit from media coverage. The goal is to garner substantial media attention, not give numerous tickets. If 10 drivers receive tickets and 100,000 people hear about it, the enforcement effort will have a bigger impact than if officers issue 100 tickets and only the recipients know what happened. The key to a successful campaign is to provide information before the enforcement event occurs to encourage community support and facilitate positive coverage. Without such prior notification, drivers may claim to be caught by surprise, which can lead to negative publicity.

There are many ways to involve the media. For example:

- Neighborhood and school leaders can hold a press conference to talk about pedestrian safety and tell the public that they are requesting more enforcement.
- Organizers can provide the press with packets of information about walking and safety statistics, and information about the need to improve the health of students.
- Informed parents, students and educators can be available to talk to the media. A child who is well-versed in the pedestrian problems near the school can provide an important perspective. Hearing a child explain how difficult it is to cross a street will have a bigger impact than reading a statistic.

Parents and the entire community can be made aware of the enforcement effort in a variety of ways to ensure they know what will happen before the program begins in force. School officials or event organizers can:

- Send home fliers with students.
- Publish an article in the local newspaper.
- Send an e-mail to all parents.
- Put up speed reader boards so drivers see for themselves what their speeds are compared to safe speeds in school zones.
- Post information signs near where the enforcement effort will occur.

As the population becomes more ethnically diverse, providing safety messages to the public in varying languages and with culturally relevant messages will be critical for the success of the effort.



# Law Enforcement Methods

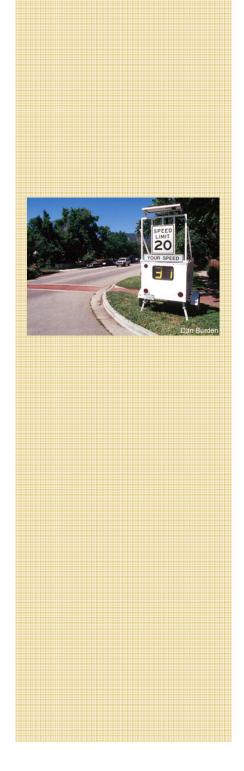
A variety of law enforcement methods can help change unsafe behaviors, making walking and bicycling safer and more attractive for children and their parents. Regardless of the method used, enforcement activities require follow-up to maintain their effectiveness. To measure the impact of an enforcement activity in a specific situation, make a quick study before and after the enforcement effort. Before-and-after studies do not have to be elaborate and can be as simple as measuring speeds or observing behaviors at crosswalks and parent drop-off and pick-up zones. Examine the results and decide on the next steps. If the results are positive, the method used may be enough to improve behavior. If the results indicate little change in unsafe behaviors, perhaps another method should be used. Even with initial success, communities will need to repeat enforcement efforts periodically in order to sustain improvements in drivers' behaviors.

# **Speed Trailers**

Portable speed trailers visually display drivers' real-time speeds compared to the speed limit. These devices may be effective in reducing speeds and increasing awareness of local speed limits. Portable speed trailers are most effective when the trailer flashes SLOW DOWN or flashes a bright white light that mimics a photo speed camera or a blue and red light that mimics a police vehicle when drivers are moving too fast. Some speed trailers have the capability to collect traffic count data and speed data throughout the day, which can be used to identify the most dangerous traffic times when more enforcement is needed.

In some cases, back-up speed enforcement by officers may be needed when radar speed trailers are used. If a driver fails to slow when the sign tells them that they are violating the law, an officer may stop the driver. The officer may choose to use the time to educate the driver with a warning, but a flagrant speeder needs to receive a ticket to reinforce the safety message. Typically, officers do not issue tickets based on the speed on the display unit. Instead, they use certified radar equipment if they are monitoring speed at the location.

Speed trailers are best used in residential areas and can be used in conjunction with neighborhood speed watch programs or other safety education programs.5, 6 Speed trailers need to be placed in locations where they do not block pedestrians, bicyclists, motor vehicle traffic or other vital traffic control signs. Speed trailers are not substitutes for permanent actions, such as traffic calming treatments to address neighborhood speeding issues.







# **Active Speed Monitors**

Active speed monitors are permanent devices to keep drivers aware of their speeds and the need to slow down near schools. They are typically mounted on a speed limit sign and visually display drivers' real-time speeds as they pass. Drivers see how fast they are actually driving compared to the posted speed limit. Some active speed monitors are solar-powered.

# Traffic Complaint Hotlines

A traffic complaint hotline allows community members to report traffic problems directly to law enforcement. It is used to identify the worst traffic problem areas and the most frequent traffic complaints. Police follow up with enforcement in the identified area and schedule additional enforcement if needed.

#### Photo Enforcement

Automated photo speed enforcement takes a real-time photo of traffic to record vehicle speeds and behaviors. It can be used to document speeders and those who drive dangerously through crosswalks. In several evaluations, the presence of photo enforcement at intersections has resulted in fewer drivers running red lights and a decline in collisions.8, 9 The mere presence or threat of photo speed enforcement at a school may result in better driver compliance and behavior.

Automated photo speed enforcement (photo radar) is just one of many tools law enforcement has to influence driver behavior and reduce vehicle speed. Photo radar systems typically operate on set speed thresholds, (e.g., 11 mph or more over the posted speed limit) only capturing images of motor vehicles moving at or above the established threshold. When a violation occurs, the system captures speed data, as well as images of the motor vehicle (and in some systems the driver) at the time of the violation. Citations are typically issued through the mail to the registered owner of the vehicle after a review of the vehicle and registration information is completed.

Photo enforcement technology does not replace traditional methods of traffic enforcement. Rather, it serves as a supplement to traditional traffic enforcement techniques, in addition to educational and engineering efforts designed to enhance traffic safety.

The use of photo enforcement technology may be affected or limited by state or local statutes. Communities wishing to apply this technology to their traffic safety efforts should consult with local courts, prosecuting authorities, law enforcement and community groups in the planning







and development of their photo enforcement programs. Some states do not allow photo speed enforcement, and for other states the areas where photo enforcement is permitted vary. Some states may not allow photo radar in general, but permit it in school zones. Also, in some locations where photo enforcement is not permitted, citizen advocates can petition their legislators to permit its use in school zones. An acceptable compromise may be reached if, for example, photo enforcement is limited to school crossings during school arrival and departure times. Photo radar provides communities with a highly flexible tool that can be deployed when and where it is needed for maximum effect. Most systems also capture data on traffic flow and average speeds, enabling communities to measure the effectiveness of the deployments in relation to crash data for the area. A permanent, fixed photo speed enforcement camera in a neighborhood will almost never be financially viable, but a mobile photo speed unit that can be carried in vans provides a feasible alternative. Such mobile units can provide excellent citywide coverage for multiple schools.

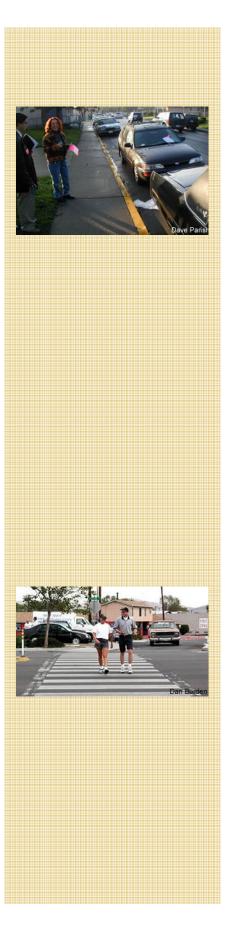
The implementation of any photo enforcement program should be carefully planned, have reasonable and attainable expectations and include public input and political support. Alerting the public to the photo speed enforcement effort before it begins is critical to avoid negative publicity. Visible warning signs need to be placed in front of the future camera's location before the effort begins so drivers will understand what will happen. An effective photo enforcement program will allow for the continuous two-way exchange of information with the community and have the flexibility to meet changing traffic safety issues and concerns.

### "Pedestrian Decoy" Operations

Another way to bring attention to problems with drivers not yielding to pedestrians is through a "pedestrian decoy" when law enforcement officers in highly visible civilian clothes pose as pedestrians crossing the street while other hidden officers observe their attempts. If a driver violates safe crossing rules by failing to yield to the pedestrian, the hidden officers pursue and apprehend violators. Because it is such a highly visible approach, it often garners media interest and publicizes the need for drivers to be aware of pedestrians.

To execute a successful "pedestrian decoy" operation, law enforcement should complete the following steps:

 Identify high-risk locations for pedestrians and communicate these locations to law enforcement, traffic engineers, schools and the public.







- Observe the locations to see the types of violations that are occurring.
- Calculate a reasonable amount of time for a driver to see and react to the pedestrian, and mark that distance back from the crossing with a cone or sign. One measure would be the "slide-to-stop" formula using a speed 10 mph over the posted limit.
- Dress the "pedestrian" or law enforcement officer in high-visibility civilian clothes. He or she should not step into the street if the motor vehicle has passed the safe distance cone.
- Identify violators and apprehend them. Other officers observe the
  crossing attempts from a hidden location that allows them to
  pursue and apprehend violators. If a concealed location is not
  feasible, the decoy officer can carry a radio to alert fellow officers
  of a violator.

# **Progressive Ticketing**

Progressive ticketing is a method for introducing ticketing through a three-staged process. Issuing tickets is the strongest strategy of an enforcement program and it is usually reserved for changing unsafe behaviors that other strategies failed to change or that pose a real threat to the safety of students.

There are three main steps of an effective progressive ticketing program:

**Educating.** Establish community awareness of the problem. The public needs to understand that drivers are speeding around schools and the consequences of this speeding for children's safety. Raising awareness about the problem will change some behaviors and create public support for the enforcement efforts to follow.

Warning. Announce what action will be taken and why. Give the public time to change behaviors before ticketing starts. Fliers, signs, newspaper stories and official warnings from officers can all serve as reminders.

Ticketing. Finally, after the warning time expires, hold a press conference announcing when and where the law enforcement operations will occur. If offenders continue their unsafe behaviors, officers issue tickets. Beginning a ticketing program with education and warnings is important, as it provides time to build support for the program as well as time for offenders to change their behaviors. Communities often find that parents receive many of the warnings and tickets issued by officers with school officials also being occasionally ticketed When conducting speed enforcement inside neighborhoods, 75 percent to 80 percent of the ticketed drivers live within a mile of the enforcement site. Conducting







enforcement at a school results in the percentage typically being on the higher side of this range.

Issuing warnings allows law enforcement to contact up to 0 times as many non-compliant drivers than the writing of citations does. In addition, the high frequency of stops ensures not only that many people directly make contact with law enforcement, but also that many others witness these stops and are prompted to start to obey the rules.

Issuing tickets is needed, however, to deal with the drivers who continue the unsafe behaviors. Ticketing also gives the program credibility by showing that law enforcement is doing exactly what they said they would do if unsafe behavior did not change. Unfortunately, for some people receiving a ticket and experiencing the consequences are the only ways to get them to become safer drivers.

#### Speed Enforcement in School Zone

Strict enforcement of speed laws in school zones is one law enforcement tool that can improve the safety for children walking and bicycling to school as well as drivers. A zero tolerance policy for speeders in school zones and even an increase in fines for drivers who violate the posted school zone speed limit are potential approaches.

# **Engineering**

Engineering is one of the complementary strategies that Safe Routes to School (SR2S) programs use to enable more children to walk and bicycle to school safely. Communities tailor a combination of engineering, education, encouragement and enforcement strategies to address the specific needs of their schools.

Engineering approaches can improve children's safety to enable more bicycling and walking. Engineering is a broad concept used to describe the design, implementation, operation and maintenance of traffic control devices or physical measures, including low-cost as well as high-cost capital measures.

This chapter serves as a toolbox of various engineering techniques aimed at creating safe routes to school. It focuses on tools that work to create safe routes by improving paths, creating safer crossings and slowing down traffic. At the same time, it recognizes the importance of a balanced roadway environment that can accommodate the needs of all modes of transportation, be it foot, bicycle or motor vehicle. In this chapter, there are examples of urban, suburban and rural school locations, which will provide various perspectives on engineering challenges and solutions.



Engineering addresses the built environment with tools that can be used to create safe places to walk or bicycle and can also influence the way people behave. Transportation engineers, city planners and architects use methods to create safer settings for walking and bicycling while recognizing that a roadway needs to safely accommodate all modes of transportation. Such improvements can include maintenance and operational measures as well as construction projects with a range of costs. When such programs are properly implemented, they may not only improve safety for children, but they also may encourage more walking and bicycling by the general public.







Engineering strategies are best used in conjunction with education, encouragement and enforcement activities.

# Guiding Principles for Applying Safe Routes to School Engineering Solutions

Several principles guide this discussion of Safe Routes to School (SR2S) engineering solutions as well as the design of a built environment that provides safe routes for children as they walk and bicycle to school. The following list states and briefly describes some of the principles:

# Infrastructure within the school zone and beyond is a prerequisite for walking and bicycling.

The physical environment often determines whether many children walk or bicycle to school. To safely walk or bicycle to school along a street or separate path, or to cross a street along the way, children need well-designed, well-built and well-maintained facilities.

SR2S programs address infrastructure needs at schools as well as along a child's route to school. Children walk and bicycle to school from locations outside the immediate school zone and often from beyond the school's designated walk zone. SAFETEA-LU, the federal transportation legislation, provides funding for SR2S activities within approximately a two-mile radius of a school.

# Relationships are everything.

The relationship of school buildings to sidewalks and street crossings can determine the level of comfort and safety a pedestrian or bicyclist experiences. All elements are interconnected; the street is connected to the sidewalk and the sidewalk is connected to the building. Getting this relationship right is critical. One important point: do not put motor vehicles between sidewalks and schools. Such obstructions add a conflict point on a child's walking route. Another relationship to consider is the school's location relative to its students' homes. A child's route to school should have a minimal number of busy street crossings, and school attendance boundaries should be drawn with this principle in mind.

# Easy-to-implement and low-cost solutions are focused on first, while longer-term improvement needs are identified and the implementation process is begun.

Effective improvements do not always require substantial funds. For example, signs and paint are relatively inexpensive and can make a big difference. Completion of these projects can build momentum and community interest in making other improvements. Easy-to-implement, low-cost, small projects done concurrently with larger, more expensive







projects will keep products on the street and build continuous interest and support from the community.

Some engineering improvements will require substantial time and financial commitment. Projects such as new sidewalks and bridges or the reconstruction of a street crossing should be identified early and advanced through the various stages required to complete them. As these longer-term improvements are developed, smaller projects can be implemented to build momentum and maintain community interest in creating safe routes to school.

# Engineering treatments are matched to the type of problem.

As communities consider improvements for the routes to school, care should be taken to identify problems or obstacles and to provide appropriate solutions to alleviate these specific problems.

Collectively, these principles guide the decisions that local professionals and members of the school community make as they begin to address issues that will improve the built environment for children to safely walk and bicycle to school. These principles will help guide decisions as communities:

- Create school walking and bicycling route maps using a variety of assessment tools and exercises.
- Identify and regulate the school zone.
- Provide and maintain bicycle and pedestrian facilities along the school route including sidewalks, on-street bicycle facilities, paths, bridges and tunnels.
- Provide safe street crossings for bicyclists and pedestrians.
- Slow down traffic.

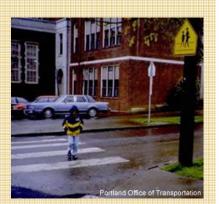
# School Route Maps and the Tools to Create Them

Identifying the safest and most direct route for a student's journey to school is an important step in the process of developing safe routes to school. This section describes school route maps and a variety of tools used to gather information about, and improve the environment for, walking and bicycling near schools.

# School Route Maps

A school route map informs each student of the safest and most convenient walking and bicycling route to school and can identify areas along the student's route that require improvements to make the route safe. While school route maps are often developed for all households





within the school walk zone, consideration should be given to areas outside of the defined walk zone and, when appropriate, to the entire enrollment area of a school.

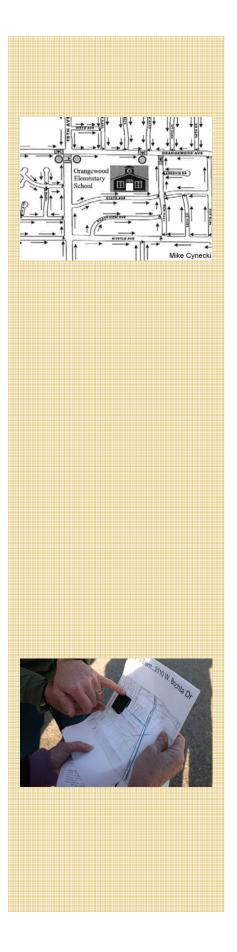
A school walking and bicycling route map not only provides way-finding for the safest routes for students to walk and bicycle to and from school, it identifies where engineering treatments may be needed and where adult school crossing guards and traffic control devices, such as signs, crosswalks and traffic signals, should be provided. In order to identify the optimal routes to school as well as problem areas, it may be necessary to conduct an assessment of the physical environment surrounding the school. Walkabouts, bike-abouts and audits are methods for assessing the built environment; these are described in the following two sections.

As part of the school route map development and evaluation processes, areas that receive an improvement, such as an engineering treatment, should be reassessed after the implementation of a change to determine if the route is now safe(r) for walking and bicycling. Attendance boundaries and mapped walking routes and bicycling routes should be reviewed at least annually to see if there have been changes to the school attendance boundary, the walk zone or the adjacent neighborhoods.

# Neighborhood Walk-abouts and Bike-abouts

Neighborhood walk-abouts and bike-abouts are environment analysis exercises used in many Safe Routes to School (SR2S) programs to raise awareness of the issues and conditions facing walking and bicycling, to garner support for needed changes and to gather information needed to help create school route maps. The walk-abouts and bike-abouts seek to identify and document the traffic and safety issues near schools and identify potential short- and long-term solutions to deal with these safety issues.

The neighborhood walk-abouts and bike-abouts are organized by the community or school and may involve local policymakers, traffic engineers and planners, law enforcement, safety professionals, and school district personnel, school nurses, parents, students, school principals and local media. The group typically meets at the school, observes the school activities during drop-off and pick-up time, and tours the school zone and walking and bicycling routes to the school. Along the way, safety concerns are documented and photographed for later discussion. Active & Safe Routes to School (www.saferoutestoschool.ca) offers a list of items to consider during a walk-about. Participants also can complete easy to use checklists. such Walkability Checklist (www.walkinginfo.org/cps/checklist.htm) and Bikeability Checklist







(www.bicyclinginfo.org/cps/checklist.htm) while conducting the walkabout or bike-about.

After the tour, the group reconvenes at the school to discuss their findings and potential short and long term solutions to address the problems they encountered. Participants leave the meeting with a clear plan of action that includes responsibilities for each person and follow-up dates. Results of the walk-about and bike-about are communicated to the school community through newsletters or other channels. A walk-about and bike-about can also be conducted by teachers with students as a hands-on learning experience about their community.

# Walking and Bicycling Audits

Walking and bicycling audits, sometimes called assessments, are processes that involve the systematic gathering of data about environmental conditions (social, built and natural) that affect walking and bicycling. Audits are typically performed by personnel with experience in pedestrian and bicycle issues or training on the specific audit tool used. One objective of the audits is to document factors that help or hinder safe walking and bicycling. These factors include, but are not limited to, street lighting, sidewalk width and condition, traffic volume, presence of bicycle lanes, topography, and presence of dogs, trash and debris.

Audits might focus on a school site, a corridor popular for bicycling or an intersection that residents find daunting. Walking and bicycling audits are tools that provide community stakeholders (parents, children, school staff, public works or traffic department staff, local engineers or planners, and law enforcement officers) with the information they need to effectively analyze the design and condition of the transportation network. This information can help identify areas conducive to walking and bicycling, identify areas where changes are needed and inform the solutions chosen to create change. For engineers and planners, audits provide useful feedback to help them incorporate these ideas into their work.

Numerous walking and bicycling audit tools exist and they can vary in the scope and scale of data they collect. Some audits focus broadly on the network or route level, while others hone in on details of the individual street segments that comprise a route or network. Determining which type of audit tool is most appropriate will depend on the audit participants, data needs and available resources. Collecting information on every street segment will provide a detailed and comprehensive assessment, but it may require data collection training and labor intensive data collection and analysis. Audit information collected at the neighborhood level can provide an overview of the walkability and bikeability along routes to



school, but it may not allow for pin-pointing a specific area along the route that is a trouble spot.

In addition to assessing infrastructure and conditions currently in place, audits can be used to analyze proposed development construction plans or other projects that will introduce change into a neighborhood. Audits are useful for analyzing proposals to ensure that the needs of bicyclists and pedestrians are accommodated in all stages of a project.

Results from the walking and bicycling audits combined with the walkabout and bike-about activities and parent and student surveys form the basis of the design of a Safe Routes to School program. This information can also be used in the development of school traffic control plans.

#### School Traffic Control Plans

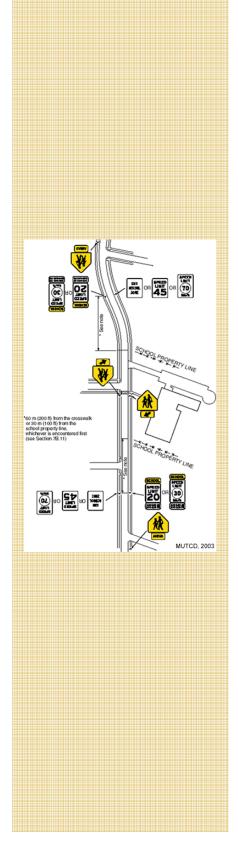
A comprehensive traffic control plan can help create a balanced roadway environment to accommodate the needs of all modes of transportation, be it by foot, bicycle or motor vehicle. A traffic control plan is a map of a school campus and the adjacent street system marked with proposed engineering improvements to increase the safety of bicyclists and pedestrians.

#### The School Zone

Ideally, the school zone starts at the front door and encompasses the campus and as many blocks as possible that surround the school and have a high concentration of school-generated traffic. Often the school zone includes the streets along the school and usually the area one to two blocks around it. The school zone should be marked with special signing to alert drivers of the high concentration of children. School crossing signs, speed signs, school zone pavement markings and other traffic calming devices remind drivers to treat the area with special care and attention.

The Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), Part 7 sets forth principles and standards for controlling traffic in school areas. These principles and standards provide information on the appropriate design, application, and maintenance of all traffic control devices (including signs, signals and markings) and other controls (including adult school crossing guards, student patrols and grade-separated crossings) required for the special pedestrian conditions in school areas. 1

Properly designed and applied traffic calming devices encourage good driver and pedestrian behavior in the school zone. Traffic calming measures such as high visibility crosswalks, street narrowing and signage can be in place all the time. Since school zones are locations frequented by





children, making the area safe for children anytime of day is a sound investment for the community.

Methods to address bicyclist and pedestrian safety within the school zone will be discussed in this section. The methods include:

- School zone signs and pavement markings
- School area speed limit and signing
- Portable speed limit signs and radar speed trailers
- Changeable message signs and speed feedback signs
- School advance warning signs and school crosswalk signs
- Overhead signs and beacons and in-street signing
- Retroreflective yellow-green school signs and post covers
- Curb paint, signs and school pavement legends

# School Zone Signs and Pavement Markings

School zone signs and pavement markings provide important information to drivers to improve safety within the school zone. The Manual on Traffic Control Devices Uniform (MUTCD) http://mutcd.fhwa.dot.gov provides national guidelines for signs and markings, and many states and local jurisdictions provide additional guidance. 2 Some jurisdictions recommend or require school signs that are larger than the sizes of signs recommended by the MUTCD or may allow different types of pavement markings. School zone signs and markings on public streets must comply with the MUTCD as well as consider any relevant local or state guidelines that are themselves consistent with the MUTCD. Signs should be used judiciously, as overuse may lead to driver noncompliance and excessive signs may create visual clutter.

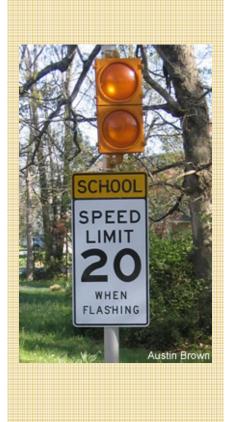
#### School Area Speed Limit and Signing

School speed limit signs vary among states, but their main objective is to alert drivers that they are entering a school zone and they need to slow down for school children. The MUTCD provides guidance for installing school area speed limit signs in school zones at a specified distance from marked school crosswalks or a certain distance from the edge of school property. The school speed limits typically range from 15 to 5 mph. These devices are important but should not be overused. Excessive and unreasonable use may lead drivers to ignore the devices.

# Portable Speed Limit Signs and Radar Speed Trailers

Portable speed limit signs are movable signs that remind drivers of the





posted speed limit. Radar speed trailers alert each passing driver to their traveling speed. These machines are used in some jurisdictions along with law enforcement. For example, the signs are put in place, parents are notified that law enforcement officers will be present, and then officers show up to ticket speeders and drivers who fail to stop for children in marked crosswalks. In other locations, signs are used with no further enforcement activity. Portable speed limit signs are discussed further in the Enforcement chapter.

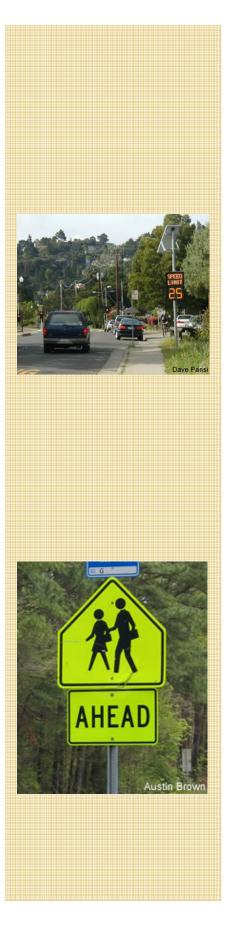
# Changeable Message Signs and Speed Feedback Signs

Permanently mounted changeable message signs are illuminated with messages or speed limits and are used to heighten awareness of speed limits in the school zone or to establish a lower speed during school crossing times. There are standard signs for school speed limit signing, and there are new innovations such as changeable message signs. Solar units are available for under \$10,000 per sign and non-solar units are sold for under \$8,000. While the non-solar equipment is less expensive to purchase, it requires a hard wire connection to a power source.

One type of changeable message sign is a speed feedback sign that shows YOUR SPEED and the SPEED LIMIT to alert drivers to their actual speed and the posted speed limit. Speed feedback signs can record traffic counts and are programmed via a Personal Digital Assistant. They work best if they flash or provide a SLOW DOWN message if drivers exceed a preset speed threshold. Occasional law enforcement is also needed at these signs. Speed feedback signs still need to be used with other standard speed limit signs placed in advance of or next to them.

## School Advance Warning Signs and School Crosswalk Signs

School advance warning and school crosswalk signs are important elements of a safe route to school. Chapter 7 in the 003 edition of the MUTCD (http://mutcd.fhwa.dot.gov/pdfs/003r1/Ch7.pdf) designates these signs to be used in advance of and at school crossings. The MUTCD and local and state regulations should be followed when considering installation in any area. Traffic signs, as well as pavement markings, which are symbols, stencils or legends applied to the surface of a roadway or a curb along public streets, must be installed or authorized by the local traffic authority, such as the city, county or state traffic engineering department. Signs should not be overused or underused, and when installed, they need to be maintained and kept clear of tree branches and other visual obstructions.







# Overhead Signs and Beacons

School crosswalks with overhead signs or flashing beacons may be helpful in alerting drivers of a busy crossing at a wide or higher speed street. These are usually placed at midblock crossings but can be used at intersections with uncontrolled crossings. Flashing beacons at a marked crosswalk may draw additional attention to the crosswalk. In a busy urban environment, flashing beacons may not provide much benefit, while on a rural road, they may increase driver awareness of the crosswalk. Some beacons are designed to flash continuously all day. In other locations the beacons are set with a timer to flash only during crossing times, or are pedestrian-activated by an automatic detector or push button and only flash when pedestrians are present. Similarly, flashing beacons are often attached to school zone speed limit signs and are activated during school hours. Flashing beacons that are activated only during school hours are probably more effective at drawing a driver's attention compared to beacons that flash throughout the day. 5

The best uses for overhead signs and beacons are at locations where drivers cannot see the marked crosswalk due to topography or other unusual barriers, such as on the crest of a hill or around a curve.

# **In-street Signing**

In-street signs are plastic signs placed in the roadway to communicate variations of the basic message YIELD TO PEDESTRIANS or STOP FOR PEDESTRIANS in the crosswalk. In-street signs are becoming very popular in some locations, but state laws vary on their allowed use. Instreet signs can be permanently installed in the roadway or mounted on a portable base to allow them to be taken in and out of the street during the school day. They are most effective when used at school crossings during school commute times only. They are more effective on unsignalized, twolane, low-speed streets than on multi-lane, high-speed streets. They can be easily damaged and need to be reset or replaced when struck. Placing signs on medians may prevent this damage from occurring, and thus may be more effective than the in-street placement. These signs should be placed in advance of the crosswalk rather than in the crosswalk, thus making drivers aware of their responsibility before they are actually at the crosswalk. When portable in-street signs are used for school crossings, they should be monitored by a school official or adult school crossing guard.

# Retroreflective Yellow-green School Signs and Post Covers

High-visibility signing, often in retroreflective yellow-green color, can draw a driver's attention. The MUTCD allows the retroreflective yellow-green color to be used for nonmotor vehicle warning signs instead of









yellow. Many communities are selecting to use high-visibility signing only in their school zones to make the school crossings stand out. The context of the school area should be understood when considering these types of signs. One guideline is that if retroreflective yellow-green signs are used, this color should be installed consistently throughout the school zone and not mixed with signs of the standard yellow school warning color.

Retroreflective yellow-green covers can also be applied to sign posts to draw the driver's attention to the sign. The retroreflective yellow-green post covers can have the SCHOOL legend printed on them.

# Curb Paint, Signs and School Pavement Legends

Curb paint and signs can be used individually or together to help convey a specific message to drivers. A painted curb means that you must follow special parking rules. Painted curbs are often located around a school to inform drivers where parking and stopping are allowed or prohibited. The color on curbs typically means:

White (or no color). Parking allowed, unless restricted or limited by signs.

**Blue.** Parking for the disabled only. Drivers must have a disabled person parking placard (typically hanging on the rear view mirror) or disabled person or disabled veteran license plate.

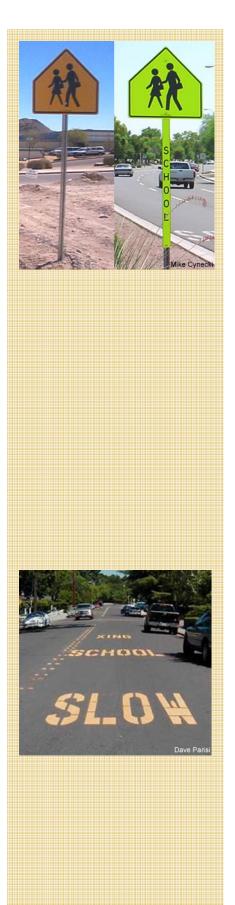
Green. Parking allowed for a short time. The time is usually shown on a sign next to the green zone, or may be painted on the curb. Green curb can also be used for student loading zones, if accompanied by the appropriate signs.

**Yellow.** Stop only long enough to load or unload passengers — no longer than posted. Drivers are usually required to stay with their vehicle.

**Red.** No stopping, standing or parking. A bus may stop at a red zone marked for buses. Red is also used to designate fire lanes at schools or NO PARKING areas.

Curb parking signs provide information that supplements curb markings. For example, parking time limits printed on a curb sign can reinforce the green paint designating that parking is allowed for a limited time.

Pavement legends or stencils are an effective way to provide further awareness to drivers near schools. Pavement stencils are placed right in the drivers' path and are a form of horizontal signing. All states provide guidance and regulations for pavement markings. The MUTCD states that crosswalks, including those for schools, should be white. Some states, like California, have yellow pavement markings in school zones, while







Arizona requires yellow crosswalk markings for 15 mph school zone crosswalks. The text messages on the pavement can differ as well, from SCHOOL to SLOW SCHOOL X-ING, STOP, 5 MPH and more. Check with your local jurisdiction for guidance. Pavement stencils should be checked annually. Installing stencils with thermoplastic or other plastic materials may cost more initially, but these materials will last longer than paint and reduce long-term maintenance costs. In areas that receive snow, consideration must be given to the fact that pavement stencils may be obscured by snow during the winter months, and that regular plowing may shorten the lifespan of the stencil. Along the School Route

Children that walk or bicycle to school need safe and well-designed facilities between their home and school. This section describes the types of infrastructure found along the school route that improve the conditions for walking and bicycling, including:

- Universal design and access.
- Sidewalks.
- Street lighting.
- On-street bicycle facilities.
- Paths.
- Pedestrian and bicycle bridges and tunnels.
- Connectivity.

## Universal Design and Access

The purpose of universal design is to provide an environment that is equally accessible and comfortable for users of all abilities and ages, including children. To help ensure access for all, the Americans with Disabilities Act (ADA) of 1990 prohibits discrimination on the basis of disability. Sidewalks and other pedestrian facilities in the public right-ofway are subject to the requirements of the ADA. In 004 the U.S. Access Board released the Americans with Disabilities Act and the Architectural Barriers Act (ADA-ABA) Accessibility Guidelines for Buildings and Facilities (www.access-board.gov/ada-aba/final.htm). These guidelines contain scoping and technical requirements for accessibility to sites, facilities and buildings by all users. Much of the information on walkway and street design contained in the ADA-ABA guidelines are contained in the 1999 Accessible Rights-of-Way: A Design Guide (www.accessboard.gov/prowac/guide/PROWGuide.htm). The Federal Highway Administration document Designing Sidewalks and Trails for Access (www.fhwa.dot.gov/environment/sidewalk/sidewalks14.htm) also provides





detailed guidance on the design of pedestrian facilities, which can be used as a supplement to the ADA-ABA guidelines.

#### Sidewalks

Sidewalks, specifically paved sidewalks, are an important piece of a walking route to school. Paved sidewalks are "pedestrian lanes" that provide people with space to travel within the public right-of-way separated from motor vehicles and on-road bicycles. They should have a level, hard surface and be separated from motor vehicle traffic by a curb, buffer or curb with buffer. Sidewalks provide places for children to walk, run, skate and play, and are often used by young bicyclists. Sidewalks improve mobility for pedestrians and provide access for all types of pedestrian travel to schools, as well as work, parks, shopping areas, transit stops and other destinations.

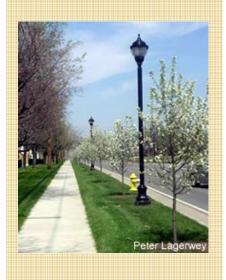
Many roads around schools are not equipped with sidewalks and can be unsafe for walking. According to a study by the UNC Highway Safety Research Center conducted for the Federal Highway Administration (FHWA), the likelihood of a site with a paved sidewalk being a crash site is 88.percent lower than a site without a sidewalk after accounting for traffic volume and speed limits. 6 A study of the California Safe Routes to School program has shown that providing sidewalks is one of the most effective engineering measures in encouraging children to walk to school.

Sidewalks should be part of all new and renovated developments. Streets that do not have sidewalks, particularly those on routes where children walk or bicycle to school, should be identified and assessed to determine if retrofitting these streets with sidewalks is appropriate.

# Street Lighting

Street lighting improves pedestrian visibility and personal security. On streets with lots of trees, street lighting scaled to pedestrians (low lights) illuminates the sidewalk even after the trees mature. Street lighting improves safety by allowing pedestrians and drivers to see each other. It also adds to personal safety and aesthetics. Two-sided lighting should be considered along wide streets, and it is especially important to provide lighting at the crossings. Lighting can also be helpful along streets adjacent to the school grounds to minimize school vandalism and improve security. While most school walking activity occurs during daylight hours, the morning school trip in the middle of winter often occurs during hours of darkness, and many school activities occur during nighttime hours.









#### On-street Bicycle Facilities

When providing student travel facilities along the street, it is not just about walking, but about bicycling too. Bicycling is an important way for children to travel to and from school. Bicycling can help students who live too far from school to walk to participate in active transportation. Use of on-street facilities is more appropriate for upper elementary school and older children who have sufficient bicycle handling skills and knowledge of bicycle and traffic safety rules. (See the Education section)

# **Bicycle Racks**

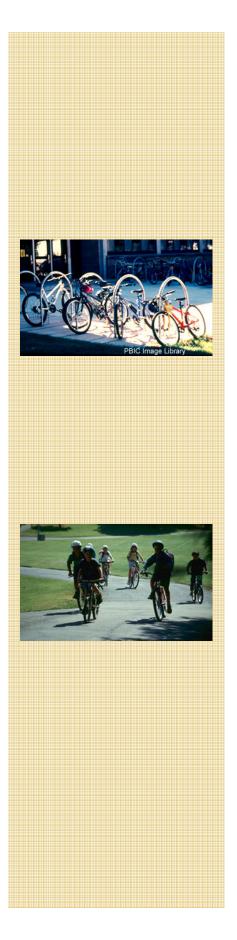
Providing a secure and convenient location for bicycle parking is one way to help encourage more children to bicycle to school. A sufficient amount of parking must be made available so that bicycles are not crowded. A good bicycle rack should keep the bicycle upright by supporting the frame without bending the wheel and should allow the frame and at least one wheel to be locked to it. Bicycle racks should be placed in a location that will minimize vandalism and maximize use while avoiding conflicts with driveways, buses and large numbers of walkers. Racks should be located in a visible location, convenient to the school entrance. Ideally, bicycle racks should be protected from the weather. For further information see Bicycle Parking Guidelines by the Association of Pedestrian and Bicycle Professionals at www.apbp.org/website/content/view/44/73.

#### **Paths**

Separated multi-use paths (sometime known as shared-use paths) are passageways that are used to increase the connectivity of the pedestrian and bicycle network. Paths can connect neighborhoods directly with schools and shorten the distance children must walk or bicycle. However, paths must be designed properly, especially where they intersect roadways, to minimize the risk of pedestrian and bicyclist crashes. Guidelines for designing paths are available in the Federal Highway Administration's Designing Sidewalks and Trails for Access Part Best Practices and Design Guide at www.fhwa.dot.gov/environment/sidewalk/sidewalks14.htm and in the American Association of State Highway and Transportation Officials' Guide for the Development of Bicycle Facilities.

Guidelines for the width of a multi-use path can range from eight to 14 feet or more. 22 Under most conditions, the recommended minimum width for a two-direction path designed for bicyclists and pedestrians is ten feet. However, when heavy traffic is expected, a path width of 1 to 14 feet is preferred. In some instances, a width of eight feet can be adequate, especially if the proportion of bicyclist or pedestrian travel is small and the overall number of users is not large.





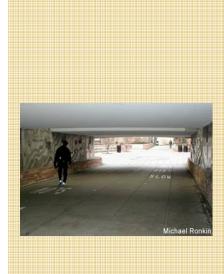
Abandoned rail lines and utility corridors often make excellent corridors for multi-use paths. Pavement for multi-use paths can be asphalt or concrete. Measures should be taken to keep motor vehicles off of the path, yet allow maintenance vehicles to have access. This can be accomplished with removable posts (bollards) that lock into place. The space between posts should typically be about five feet wide to prevent motor vehicle access, but comfortably allow bicycle access. Agencies need to monitor conditions along the path for maintenance and repair. School officials, students and other path users can be a good source of information to alert the agency when bushes need trimming along the path or the surface is in need of debris removal or repair.

# Pedestrian and Bicycle Bridges and Tunnels

Pedestrian and bicycle bridges and tunnels are sometimes appropriate to improve street or route connectivity or provide routes over or under roadways. Overpasses and underpasses are most appropriate when children would otherwise be forced to cross freeways or major multi-lane, high-speed arterial streets to travel safely to or from school. There are also situations where pedestrian signals are not warranted and/or feasible; overpasses and underpasses may be useful during these times. Such separated crossings are most feasible where terrain conditions allow for crossing over or under the roadway without having to provide long ramps or steps. Americans with Disabilities Act (ADA) guidelines require that all facilities be accessible to all users, including those in wheelchairs and the visually impaired. Pedestrian bridges and tunnels can be very costly to build. Bridges over an arterial street will likely cost more than \$1.5 million and will often require extensive ramps. The high cost of such grade separation should be considered along with security issues, drainage problems, lighting needs and maintenance.

Pedestrian and bicycle bridges and tunnels can range from short connections over streams to long bridges with extensive approach ramps over highways. The location selected for any bridge or tunnel is an important factor in its effectiveness. Like all pedestrian crossings, any facility that is inconvenient or requires an indirect path will simply not be used. The effectiveness of a grade-separated crossing depends on its perceived ease of use by the users. Pedestrians will weigh the perceived safety benefit of using the bridge versus the extra effort and time it will require when making a decision about where to cross. Often it is best to redesign the crossing or modify the traffic control at the at-grade crossing instead of building an overpass or underpass. Some schools assign adult school crossing guards at nearby bridges to assure that students use them.





# Connectivity

The connectivity of various bicycle and pedestrian facilities directly impacts the ability to walk or bicycle to school. Characteristics of a well-connected road or path network include short block lengths, numerous three and four-way intersections and minimal dead-ends (cul-de-sacs). 27 As connectivity increases, travel distance decreases and route options increase. A network of streets, sidewalks, bicycle lanes and paths in which all parts are well-connected to each other reduces the distance children have to travel to get from home to school, allows for the use of more local streets rather than major roadways and provides a greater choice of routes to travel to and from school.

Street layout directly impacts the ability to walk or bicycle to school. Frequently, the layout of subdivision streets makes distances much longer than they need to be. Long neighborhood block lengths and cul-de-sacs contribute to this problem. Neighborhoods that are designed with long blocks and numerous cul-de-sacs are often barriers to walking and bicycling to school; they reduce connectivity and increase travel distance between the home and school.

To help solve the cul-de-sac issue, connector paths between cul-de-sacs and other destinations can be constructed:

- At the time when the subdivision is first developed.
- As a voluntary retrofit.
- As a mandatory retrofit when the property is sold or redeveloped.

Another potential solution is to create zoning ordinances that prohibit or limit the number of cul-de-sacs in a defined area or subdivision. Once constructed, attempts to retrofit existing cul-de-sacs with connectors often require significant efforts to garner support from neighbors and elected officials. Ordinances can also be used to establish block length.

School connectors can be built on dedicated public rights-of-way or on sidewalk easements. Children will frequently find their own informal ways of walking or bicycling to school. Instead of discouraging these paths, pay attention to the children and formalize the connections they make. Not all routes to school need to be paved, but paved routes will provide for an all-weather connection that can be used on rainy days by pedestrians or bicyclists.

# **Crossing the Street**

A child's journey to school on a bicycle or by foot will likely require crossing one or more streets. Many situations arise at street crossings that







can impact the safety of the crossing for all pedestrians. Underlying good, safe design at pedestrian crossings is the need to keep the street crossing simple. The development of safe crossings for children is guided by several principles including the need to:

- Establish or identify good crossing locations.
- Reduce crossing distances.
- Use appropriate traffic controls such as marked crosswalks, traffic signals and warning signs or flashers.
- Slow motor vehicle speeds.

Engineering improvements recommended for creating safer routes to school are based on these principles. This section describes a variety of treatments that are used to create safer street crossings:

- Tools to reduce crossing distances for pedestrians.
- Marked crosswalks.
- Enhanced-visibility crosswalks.
- Traffic signals.

# Tools to Reduce Crossing Distances for Pedestrians

Wide, multilane roads are barriers to walking and bicycling to school. If children cannot cross multi-lane roads then they are, in essence, trapped in their neighborhoods, unable to walk or bicycle to school or to play and explore outside of their immediate neighborhood.

School walking routes and big roads do not mix. High-speed, busy, multilane roads are a barrier to walking and bicycling. In an effort to provide safe routes for children, such roads should mark the boundary of a school walking zone. Ideally, school attendance boundaries should be designated along the major arterial streets to avoid the need for young children to cross them, and schools should be built within neighborhoods, not on the other side of busy streets from students' homes.

The distance required to cross a street and the length of time that a pedestrian is exposed to traffic can be shortened with curb extensions and crossing islands. Curb extensions, also known as curb bulbs or bulb-outs, reduce the distance pedestrians must walk in the street, while crossing islands also simplify a crossing by breaking it into two pieces.

#### Marked Crosswalks

A marked crosswalk can benefit pedestrians by directing them to cross at locations where appropriate traffic control, including traffic signals or





adult school crossing guards, either currently exist or can be provided. However, marked pedestrian crosswalks in and of themselves do not slow traffic or reduce pedestrian crashes.

There are several reasons to install marked crosswalks, a few being:

- To indicate a preferred pedestrian crossing location.
- To alert drivers to an often-used pedestrian crossing.
- To indicate school walking routes.

# **Enchanced-Visibility Crosswalks**

Lighted Crosswalks. Crosswalks with in-roadway warning lights, also referred to as flashing crosswalks, may be used to further alert drivers to crosswalks and to children crossing the street. Lighted crosswalks consist of a series of lights that are embedded into the pavement along the crosswalk lines, which are activated when a pedestrian pushes a button or starts walking into the crosswalk.

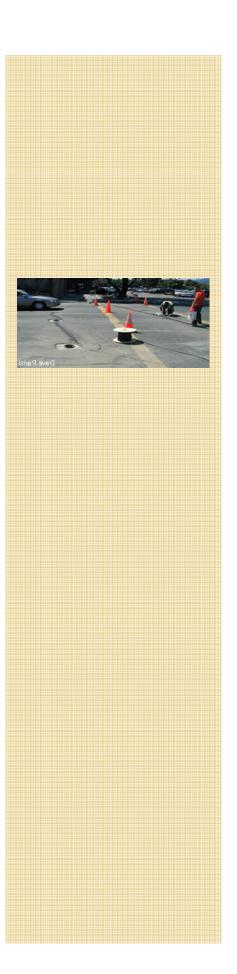
To date, no studies exist that have quantified the effects of lighted crosswalks on pedestrian crashes. Studies have found mixed results in terms of their effect on drivers yielding to pedestrians and motor vehicle speeds. These devices are expensive to install and have high maintenance costs. High-tech solutions, such as lighted crosswalks, should not be used without also considering geometric and other traffic control solutions. Flashing crosswalks cannot be used at traffic signals.

For more information on in-roadway warning lights visit the 004 PEDSAFE "School Zone Improvements" Cupertino, California, case study at www.walkinginfo.org/pedsafe/casestudy.cfm?CS\_NUM=7. Another case study is available from PEDSAFE named "Illuminated Crosswalk" Denville, New Jersey, case study at www.walkinginfo.org/pedsafe/casestudy.cfm?CS\_NUM=5.

Yield Lines and Set-back Stop Lines. Yield lines and set-back stop lines in advance of crosswalks improve a driver's view of the pedestrian in the crosswalk, reduce the number of motor vehicles encroaching on the crosswalk and indicate that drivers should yield to pedestrians in advance of crosswalks. Stop lines are used in advance of marked crosswalks at signalized intersections, while yield lines are placed in advance of unsignalized crosswalks.

A clear and simple marked crosswalk with set-back yield markings placed well in advance of the crosswalk can reduce the chance of a multiple-threat collision. A YIELD HERE FOR PEDESTRIAN sign is important in addition to the advance yield line. A multiple-threat collision is a





pedestrian crash that occurs when pedestrians have to cross more than one lane in each direction. A motor vehicle in one lane stops and provides a visual screen to the driver in the adjacent lane. The motor vehicle in the adjacent lane continues to move and hits the pedestrian.

A line of painted triangles, also referred to as "shark's teeth" yield markings are appropriate for use as the yield line at unsignalized locations, as per the Manual on Traffic Control Devices (MUTCD) 2003 Edition. Some states have called for the placement of lines 30 to 50 feet prior to crosswalks at unsignalized locations. This distance is far enough away to provide for improved sight distance in the adjacent lanes. If the stop lines are placed more than 50 feet away, drivers are more likely to ignore the line and stop only a few feet prior to the crosswalk or in the crosswalk.

Advance stop lines at midblock signals can help improve the visibility of that signal as drivers may not expect to stop at a midblock traffic signal. Advance stop lines at signals results in the need for longer change intervals for drivers (yellow plus all red times).

# Parking Restrictions at Corners

Restricting parking at corners will improve visibility of the crossing for both drivers and pedestrians. At a minimum, 30 feet should be kept clear in advance of marked crosswalks to help pedestrians and drivers see each other better. Distances greater than 30 feet are generally better, but parking restrictions have to be balanced with the need of the driver. For example, if parent parking is severely restricted or completely removed near schools, parents may ignore all parking restrictions.

#### **Traffic Signals**

Signalizing busy intersections and providing signalized crosswalks help create safe routes to schools for children. New traffic signals are very expensive and must be warranted or they could cause more harm than good. Warrants for installing traffic signals are provided in the MUTCD at http://mutcd.fhwa.dot.gov/HTM/003r1/part4/part4c.htm.

Traffic signals are the highest form of traffic control. However, their benefit to the pedestrian network is contingent upon the application of several principles including:

# Mark all legs of an intersection.

Pedestrian paths (marked crosswalks) should be provided on all sides of an intersection where pedestrian crossings are desired. A school walking route plan may limit crossings to three or fewer legs, but all options should be available for school officials to select the most desirable crosswalks to use.







# Provide pedestrian signal heads in all directions.

Pedestrian signal indications (WALK, flashing DON'T WALK, DON'T WALK or walking man and raised hand symbols) should be provided at every signalized crossing.

# Only use pedestrian pushbuttons if they are needed.

Push buttons are generally appropriate at locations with low or intermittent pedestrian activity. If used, they should be in clear view, wheelchair accessible and responsive to those who push the buttons.

# Install landings on all corners.

Fully accessible landings should be in place on all corners to provide a safe place for people to wait.

# Paint stop bars for motor vehicles on all approaches.

Stopping vehicles in advance of the crosswalk keeps the crosswalk clear for pedestrians and can reduce right-turn-on-red conflicts

# Install curb ramps on each corner.

Two curb ramps per corner; eight per intersection is generally recommended, although there are situations where one diagonal ramp per corner is an acceptable option (e.g., where there is a wide turning radius and two ramps per corner is not feasible).

## Provide streetlights on all four corners.

#### Minimize pedestrian wait time.

The longer people must wait to cross the street the more likely they will decide to cross against the signal. Pedestrian wait time can be reduced by shortening the overall signal cycle length or by providing an actuated demand-responsive pedestrian signal. Some pedestrians, especially large groups of children, may need more than the 4 feet per second standard that is used to calculate the time needed for the pedestrian clearance interval. However, longer pedestrian clearance intervals may result in longer signal cycle lengths, and thus longer wait times between WALK signals.

#### **Pedestrian Pushbuttons**

Pedestrian pushbuttons are electronic buttons used by pedestrians to change traffic signal timing to accommodate pedestrian crossings. Pushbuttons may be needed at some crossings, but their use should be minimized. Signals can be put in pedestrian "recall" for key time periods of day such as school crossing times. During these periods the pedestrian







WALK signal would be displayed every signal cycle. As traffic signals become more complex pedestrian pushbuttons are needed. If buttons exist, pedestrians must push them to get enough time to cross the street. Standard pushbuttons often result in longer waits to cross the street, especially if the pedestrian fails to push the button. Only about 50 percent of pedestrians actually push the buttons based on a Federal Highway Administration research project. 34 If used, they should be clearly visible and within easy reach for people in wheelchairs. Pushbuttons need to be checked periodically to assure that they are working.

# Countdown Pedestrian Signals

Adequate time must be provided for pedestrians to cross the street safely. Countdown signals help by giving pedestrians information about how much crossing time remains. There is a good deal of confusion by most pedestrians on the meaning of the flashing DON'T WALK signal. While it technically means don't start walking if the pedestrian has not yet started to cross the street, some pedestrians and drivers think that they are supposed to see the WALK signal for the entire crossing and they will not have enough time to cross as soon as the flashing begins. The countdown signal shows the number of seconds remaining to cross the street. Some studies have shown that countdown signals reduce the number of stragglers in the street when the signal changes, although some people may still start late.

#### Accessible Pedestrian Signals

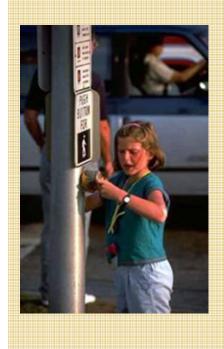
Accessible pedestrian signals (APS) are audible signals that indicate when it is or is not appropriate to cross the street. Federal Americans with Disabilities Act guidelines encourage the use of accessible pedestrian signals where there is a need to accommodate pedestrians with visual impairments. Accessible signals come in a variety of designs but include an audible signal and tactile (vibration) guidance for pedestrians. There are comprehensive resources providing information on accessible pedestrian signals available on the Web site of the Pedestrian and Bicycle Information Center at www.pedbikeinfo.org.

#### **Slowing Down Traffic**

High-speed motor vehicles pose a serious threat to the safety of children who are crossing streets. One of the biggest challenges in providing children with safe walking and bicycling routes to school involves slowing down traffic.

Slower motor vehicle speeds allow drivers to stop in a shorter distance and reduce the chance of injuring a pedestrian or bicyclist. A motor vehicle









traveling on a level surface at a rate of 40 mph will need nearly 300 feet between the vehicle and the child to stop in time to avoid a collision. This distance is reduced to approximately 197 feet for a vehicle traveling at 30 mph, 112feet for a vehicle traveling at 0 mph and 77 feet for a vehicle traveling at 15 mph. 41

Pedestrian crash severity is also much lower at low motor vehicle speeds. If a pedestrian is struck by a motor vehicle traveling at 40 mph there is an 85 percent likelihood that the pedestrian will be killed. This percentage drops to 45 percent at 30 mph and 5 percent at 0 mph. Thus, slowing motor vehicle speeds not only reduces the chance of a crash due to the shorter stopping distance that is required, but it also reduces the chance of a pedestrian fatality or serious injury. 42

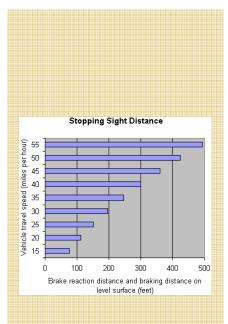
When slowing or "calming" traffic, the right design invites the right driver response. The guiding principle of traffic calming is to influence driver speed and behavior through good design whenever possible, rather than by traffic control measures such as traffic signals and STOP signs.

There are many design and engineering tools that can be used to slow down traffic and make it safer for children to walk and bicycle to school including:

- Narrow lanes.
- Chokers and chicanes.
- Speed humps.
- Raised pedestrian crosswalks.
- Neighborhood traffic circles.
- Reduced corner radii.
- Speed sensitive signals.

#### **Evaluation**

It is easy to be enthusiastic about a one-day walk to school or bicycle rodeo event. Once the enthusiasm of the event is over, though, Safe Routes To School (SR2S) leaders are left with the task of building an ongoing, comprehensive, community-change effort, which requires collaboration from many people and organizations, and money and time to implement. At the end of the day, everyone wants to know: "Were we successful? Is this community safer and healthier because of what we did?" Decision-makers, funders, and local advocates need concrete indications that the answers to these questions are "yes."



After the program begins, careful monitoring identifies which strategies are increasing the number of children safely walking and bicycling to school.







#### **Indicators of Success**

Evaluation frightens many people. Others just don't want to be bothered; they are engaged in positive activities, and children and parents are happy. However, as the movement of SR2S has matured in the United States, it has become clear that evaluation data are critical. Collecting data is important at the beginning of a project, in order to identify and address areas of concern. This identification of a problem is a powerful motivator for action to create safe routes to school. Ongoing evaluation helps to keep a project on track, and to document changes at different points in time.

Over the past several years, we asked numerous people involved in SR2S what evaluation information they want. We asked them:

- What information would help you know you have been successful?
- What would help you change strategies if something you're doing is not working?
- What information would help you gain buy-in from those who could support your efforts through legislation or funding?



Key	Indicators of	f Success	for Safe Ro	outes To S	School Efforts
<b>—</b>	illulcators of	I SUCCESS	IUI Saic IN	Jules IV s	JUIUUI LIIUI U

Outcome	Measure	Desired
Outcome	Before and After	Change
Behavior of	<ul> <li>Numbers of children walking to and from school</li> </ul>	↑More
children	<ul> <li>Numbers of children bicycling to and from school</li> </ul>	↑More
Ciliuren	<ul> <li>Skills for walking and bicycling safely</li> </ul>	↑Better
	<ul> <li>Numbers of vehicles arriving and departing school at</li> </ul>	↑Fewer
	morning drop-off and evening pick-up times	
Behavior of	<ul> <li>Speed of vehicles in and around school area</li> </ul>	↑Slower
drivers	<ul> <li>Aggressive driving behavior (e.g., not yielding to</li> </ul>	
urivers	pedestrians)	↑Less
	<ul> <li>Number of driving trips by parents and length of</li> </ul>	
	morning and evening commute	↑Less
Community	<ul> <li>Quality of walking environment: number and usefulness of</li> </ul>	↑Better
facilities	sidewalks and bike lanes	
lacilities	<ul> <li>Safely designed intersections (lights, crosswalks, etc.)</li> </ul>	↑More
	<ul> <li>Number of traffic crashes involving children walking or</li> </ul>	
	biking to and from school	↑Lower
Crashes and	<ul> <li>Severity of injuries to children from traffic on their way to</li> </ul>	
Injuries	and from school	↑Less severe
illjuries	<ul> <li>Number of conflicts between vehicles and</li> </ul>	
	pedestrians/bicyclists which would be likely to lead to	↑Lower
	crashes (i.e., "near misses")	
	<ul> <li>Number of different types of people involved in the SR2S</li> </ul>	↑More
	effort	Titore
Community	<ul> <li>Level of commitment and energy displayed by the SSR2S</li> </ul>	↑Higher
buy-in	collaborators	i iligilei
	<ul> <li>Parent enthusiasm about SR2S and allowing their children</li> </ul>	↑Higher
	to walk or bike	1 Higher
Environmental	<ul> <li>Level of air and noise pollution in school area</li> </ul>	↑Lower
quality	<ul> <li>Land devoted to parking and drop-off/pick-up areas</li> </ul>	↑Less

Depending on how the leaders of the SR2S effort define the problem in their community, they might gather information on all of these measures, or only some. Some measures are technical and difficult to collect: air quality data, injury data, vehicle speed. Some are very easy: number of cars driving up to the school gate at a certain time. For many of the measures, the data collector will want to know more than just a simple number—perhaps a rate or a percentage, especially if working with several schools. It is important to note that crash and injury numbers may be low simply because fewer children walk or bicycle. In this case, this is not an indicator that a neighborhood is safe; it may indicate that parents don't consider the area safe enough to allow their children to walk or bicycle.





Data Needs and Sources					
Specific Information Needed	Sources for Data				
Current walking/biking levels among students  Potential walking/biking level (number of	Student survey     Observation in front of school     School records of students' home addresses				
students within reasonable distance of school who do not currently walk/bike)	<ul> <li>Student survey of distance to school</li> <li>Parent survey of distance to school</li> </ul>				
Physical barriers to a safe or appealing walk/bike trip to school	<ul> <li>Student survey with maps</li> <li>Parent survey with maps</li> <li>NHTSA Walkability/Bikeability Checklists, filled out by surveying the neighborhood</li> </ul>				
Preference or attitudinal barriers to walking/biking to school	<ul> <li>Student survey, Parent survey</li> <li>Survey of support for walking/biking in local community (from parents, community groups, schools, government, and health professionals)</li> </ul>				
Pedestrian and bicyclist crashes and injuries Local police department data	<ul> <li>Local hospitals</li> <li>National Center for Health Statistics</li> <li>Public health department</li> <li>Other advocacy groups</li> </ul>				
Traffic law infractions near school	<ul> <li>Local police department data</li> <li>Special police study</li> <li>Observational study by advocates</li> </ul>				
Dangerous behavior near school (e.g., abductions, harassment of students, bullying)	Local police department data     Reports from school administrators				
Physical activity level of students	Student survey				
Walking/biking behavior in community	Parent survey; community survey				
Air pollution caused by private car trips to/from school	Observations of parents or students regarding the smell of the air     Air pollution monitoring via mechanical device				



# **ENGINEERING AND OTHER STUDIES**

# **Engineering Studies**

This section of the Framework provides a repository for recent and past engineering studies performed in support of the SR2S program.

The preliminary school route maps are included in the *Engineering Evaluation Technical Memorandum* that follows.

The Program Framework electronic media includes the February 2008 SR2S Engineering Study

# **Alert: Proposed Changes to MUTCD**

On January 2, 2008, the FHWA issued a *Notice of Proposed Amendments (NPA) to the MUTCD*. There exists a high probability that these proposed changes will be adopted in early 2009. The City should, upon verifying the changes, update the signing and pavement marking recommendations in this *Framework*. Of particular relevance to the SR2S Program are the following changes:

- Fluorescent yellow-green will be the required color for all school-related warning signs. (MUTCD Parts 2C and 7)
- The Pedestrian Volume warrant (#4) for traffic signals will be revised. (Part 4)
- A new traffic signal warrant (#9) will be added for intersections near railroad grade crossings. (Part 4)
- Countdown displays will be required for all new pedestrian signals and a multi-year window for replacing existing non-countdown displays will be provided. (Part 4)
- Slower walking speeds will be used for calculating pedestrian clearance time. Pedestrian clearance will be based on 3.5 feet per second. Walk time plus pedestrian clearance time will be based on 3.0 feet per second. (*Part 4*)
- A new pedestrian hybrid signal will be included for use at mid-block pedestrian crossings. (Part 4)
- School children symbol may be used on in-street signs at school crossings. (Part 7)
- Overhead pedestrian crossing signs may be used at unsignalized school crossings. (Part 7)
- A new symbol sign will replace the S3-1 "School Bus Stop Ahead" sign. (Part 7)
- The end of a school speed zone shall be marked with an "End School Zone" accompanied by a speed limit sign. (*Part 7*)



# Technical Memorandum

# **Arizona Transportation**



TO: Brent Billingsley, AICP, Development Services Director

Mary Witkofski, LMSW, Grants Manager Kellee Kelley, SR2S Project Manager

FROM: Doug McCants, PE, PTOE

RE: City of Maricopa Safe Routes to School

Final Engineering Assessment and Community Attitudes Assessment

DATE: March 21, 2008

#### **BACKGROUND**

Recognizing the importance of pedestrian and bicyclist safety and the benefits of students walking and biking to school, the City of Maricopa, in cooperation with the Maricopa Unified School District (MUSD), initiated plans for a Safe Routes to School (SR2S) Program in 2007. Following a successful grant application (*Moving Past Barriers*) through the Arizona Department of Transportation (ADOT), the City initiated the first steps in the program development:

- Formation of a SR2S team that included representatives from the City, MUSD, police and fire departments, and citizens
- Selection of a consultant (PBS&J) to assist the team with
  - Engineering evaluation of current infrastructure and operations in the vicinity of existing schools
  - Assessment of community attitudes toward walking and biking to school
  - Development of an initial SR2S Program Framework (referred to hereafter as *Framework*)
  - Development of initial walk/bike-to-school maps for the existing schools

This technical memorandum addresses, in summary form, the engineering evaluation and community attitudes elements of the consultant's work and serves as Section 5 of the *Framework*.

#### **APPROACH**

PBS&J worked with the SR2S team to finalize a scope of work to effectively complete the community attitudes assessment and engineering evaluation. The goal of both activities was to establish a baseline of information on which the SR2S team could:

- Build a local, sustainable program
- Initiate infrastructure, operational, and other improvements that would encourage safe walking and biking to school
- Evaluate the successes of the program over time

Per grant restrictions, the evaluation and assessment were limited to the elementary and middle schools (Grades K-8).

#### **Assessment of Community Attitudes**

Community attitudes are often based on perceived barriers (real or otherwise) and have a significant influence on the number of students who walk or bike to school. Identifying and understanding those perceptions were critical in order to develop successful engineering, encouragement, education, and enforcement elements of the SR2S Program. PBS&J, in cooperation with the SR2S team, initiated a *Parents Survey* (A copy of the survey is provided in Attachment 1) that was distributed in December 2007 to every MUSD K-8 student. The survey distributed in MUSD is a customized version of a standard bilingual survey that is being used by SR2S teams nationwide.

Students were asked to take the survey home, have their parents complete it, and return the completed surveys to their classroom teacher. The surveys were then collected and the responses tabulated and analyzed. Results of the Parents Survey were also compared with the results from the quarterly in-class tallies of walking and bicycling behavior.

#### **Engineering Evaluation**

SR2S engineering evaluations focus on the built environment within a set radius of each school. For the City of Maricopa, PBS&J utilized a one-mile radius as that represents the typical upper limit for walking or biking distance to school. Further, MUSD offers bus transportation for students who live more than one mile from school. Given the City's and MUSD's concern that students not cross SR 347 on foot or bike due to safety concerns, the engineering evaluation did not include walking and biking between neighborhoods and schools on opposite sides of this major arterial.

An engineering evaluation provides a sound basis for:

- Identifying and regulating the school zone
- Providing and maintaining bicycle and pedestrian facilities along the school route
- Providing safe street crossings for bicyclists and pedestrians
- Calming traffic

A complementary component of the evaluation is the creation of walk- and bike-to-school route maps.

As part of the evaluation, PBS&J's team of engineers:

- Inventoried the existing infrastructure in the vicinity of each school
  - bike paths/lanes
  - sidewalks
  - intersection controls
  - signing
  - speed limits

- route continuity
- roadway laneage
- crosswalks
- pedestrian signals
- other relevant features
- Documented school locations, hours, and attendance boundaries (as well as walk-to-school boundaries)
- Compiled accident history (school-age pedestrians and bicyclists)
- Documented existing school-age pedestrian and bicyclist safety procedures
  - reduced speeds
  - fixed and portable signing
  - crossing guards

- flashing warning lights
- other

- Reviewed enforcement practices
- Observed operational characteristics of the school/street interface
- Conducted interviews with staff from each school

The findings and recommendations are summarized later in this report.

#### **FINDINGS**

#### **Community Attitudes**

Parents Surveys were distributed to approximately 3,100 elementary school students and 1,250 middle school students. Of those, 459 and 12 were returned, respectively. This represented a response rate of nearly 15% for the elementary schools and 1% for the middle school. Given the small sample size at the middle school level, PBS&J determined it unlikely that analysis of the middle school responses would garner any meaningful results. The remainder of the findings presented here represent an analysis of the elementary school surveys only. A comprehensive summary of the analysis results is provided in Attachment 2.

The analysis of the Parents Survey was performed in two parts:

- All K-5 surveys (n = 459)
- K-5 surveys only for students living within one mile of the school they attend (n = 251)

Key findings of the analysis are summarized in the following subsections.

#### School Commute Type

Perhaps most informative was the relatively small proportion of elementary school students who currently walk or bike to school and the <u>very high proportion that arrive via family car</u>. These findings are not inconsistent with the visual observations of traffic at or in the vicinity of the schools at the start and end of the school day.

School Commute Type	Students K-5 within 1 mile of school				
School Commute Type	Home to School (a.m.)	School to Home (p.m.)			
Walk	15%	20%			
Bike	9%	9%			
Carpool	5%	4%			
Family Car	60%	53%			
Bus	11%	14%			

Increasing the percentage of walk/bike commutes and reducing the number of parents/others picking up and dropping off students will be a key goal of the SR2S Program.

#### **Constraints**

The question becomes "what are the underlying concerns or issues contributing to the small number of students walking/bicycling?" Parents were asked to identify the specific issues that "affected your decision to allow, or not allow, your child to walk or bike to/from school." Responders were allowed to select more than one of the identified issues listed as well as to add their own "write-in" issues.

Issue	Number of times issue cited by parents as a factor (K-5 less than 1 mile)	Percent of parents who cited this issue and who would change their mind if the issue was corrected/improved
Violence or crime	110	30%
Safety of intersections	106	32%
Distance	105	20%
Amount of traffic along route	99	29%
Speed of traffic along route	90	29%
Weather	90	33%
Sidewalks or pathways	58	22%
Crossing guards	51	32%
Time	49	18%

Of the issues cited, <u>violence/crime</u>, <u>intersection safety</u>, <u>and volume/speed of traffic will be the key concerns for the SR2S team to address</u> through engineering, education, encouragement, and enforcement components of the program.

#### Appropriate Walking/Biking Age

Parents were also asked to identify the grade level at which it would be appropriate for their child to walk or bike to school. Overwhelmingly, 59% of parents indicated that it would not be appropriate for their child at any time during elementary school (K-5). This negative response will likely decline as changes are made to address the issues identified in the previous section.

Grade	Parents indicating walking/biking to/from school is appropriate
K	1%
1	1%
2	8%
3	12%
4	9%
5	9%
Never	59%

#### **Encouragement**

When asked if their child's school encourages walking/biking to/from school, <u>80% of parents responded</u> the schools neither encouraged or discouraged walking/biking. 12% of respondents felt schools did encourage walking/biking while 8% believed the schools discouraged walking/biking. This finding suggests a need for education and encouragement activities within the schools and community.

#### Additional Comments

Parents were invited to provide additional comments. As might be expected, many of these comments were reinforcements of the issues/constraints identified earlier and primarily focused on:

- Security (potential for crimes against children and the importance of walking in groups)
- Safety (traffic volumes, driver speeds, and time-of-day light/dark issues)
- Operations (pick-up/drop-off procedures, bus availability, additional crossing guard needs, and need for increased police presence)
- Distance to school
- Facilities (need for additional crosswalks, sidewalks, bicycle storage areas)

#### **Engineering**

Discussion of the findings of the engineering evaluation is presented here by key element:

- School Zone (Signing, Pavement Markings, and Crossing Guards)
- Bicycle and Pedestrian Facilities
- School Site / Transportation Network Interface
- Other Issues and Concerns

#### School Zone

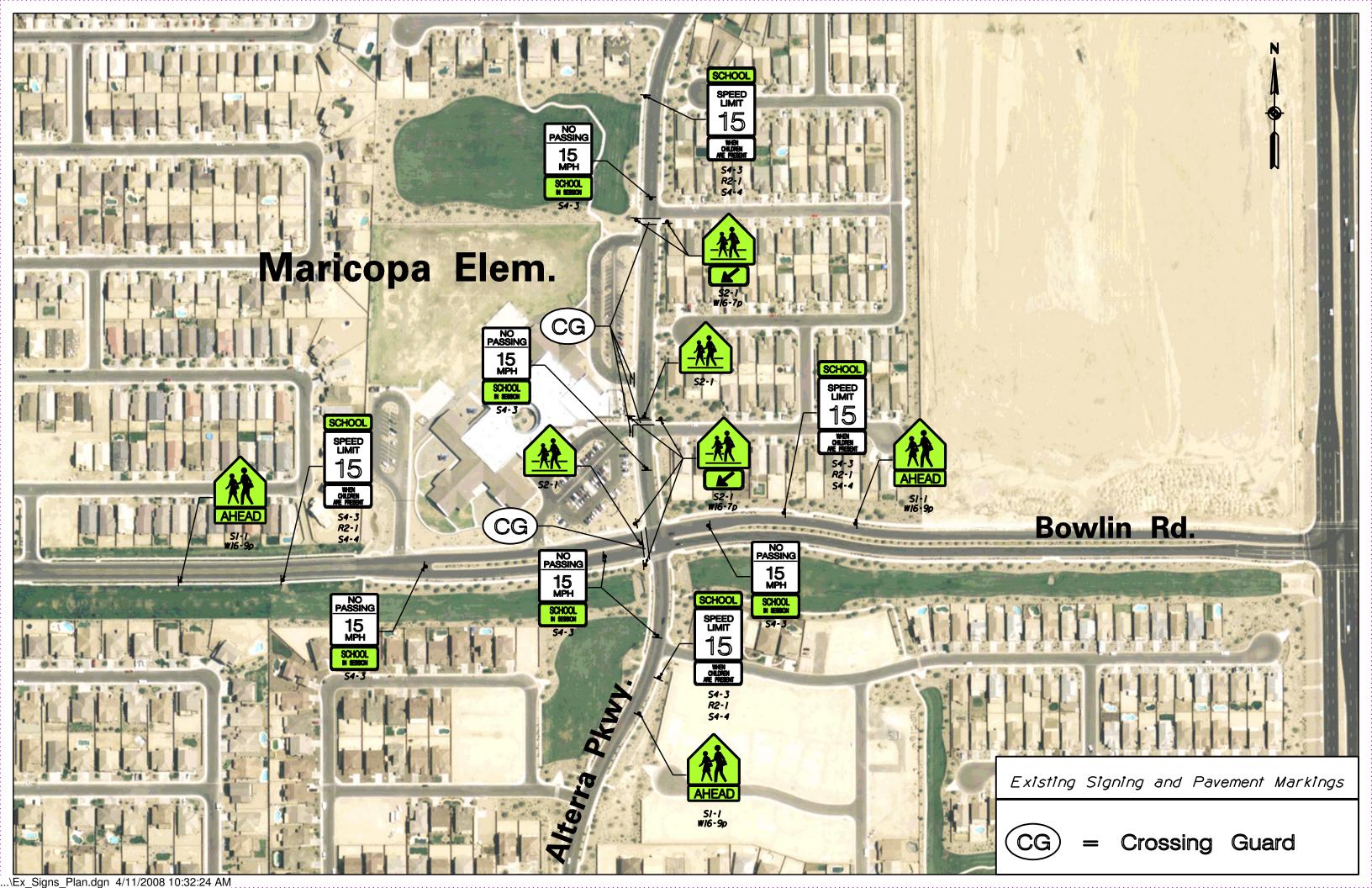
The diligence of the City of Maricopa is evident in its well-planned and -executed school zone signing and pavement marking program. The existing installations are depicted graphically on the following five pages and include the following features superimposed upon aerial photography of the immediate school site:

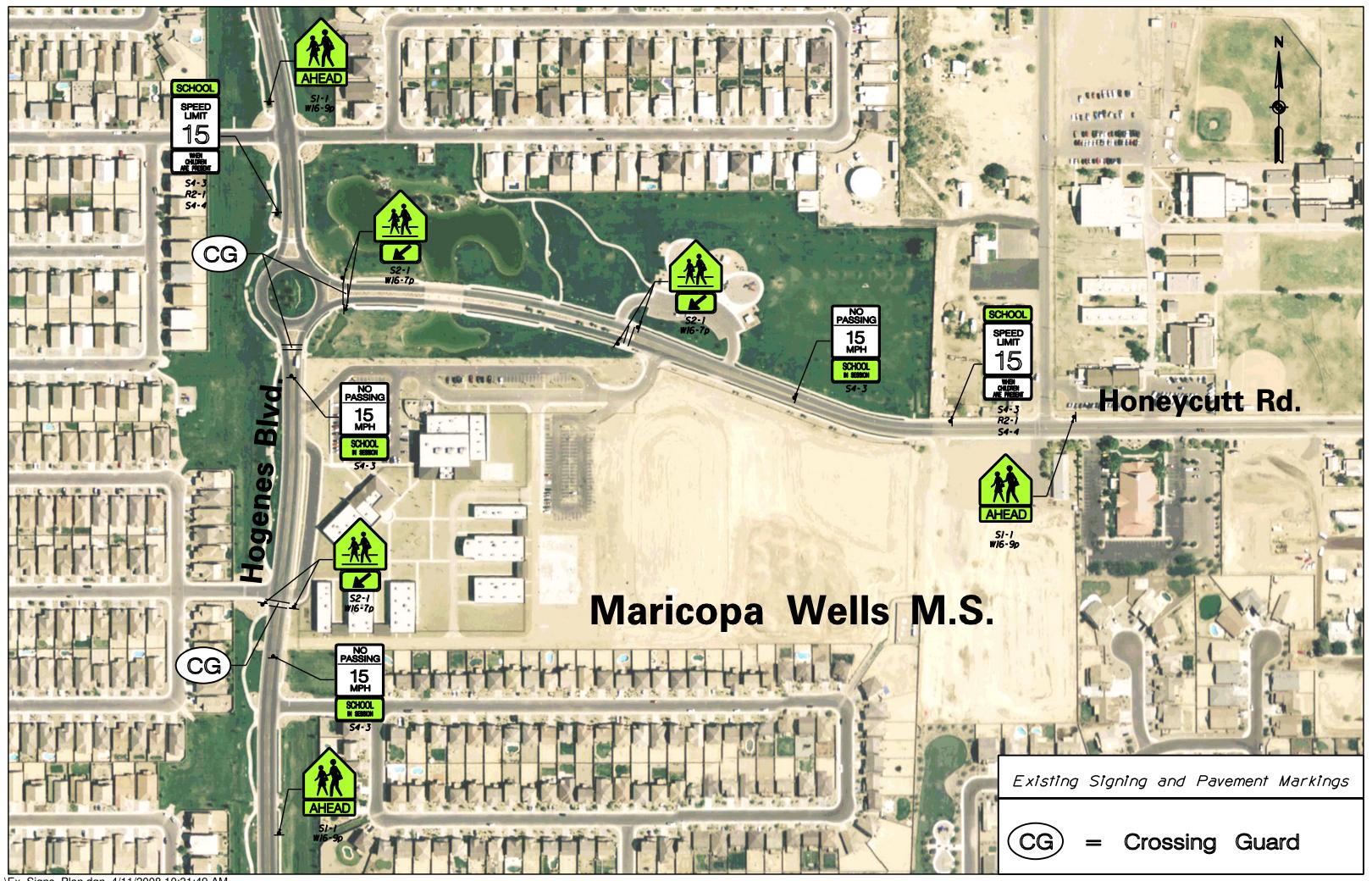
- Crossing guard locations
- Crosswalk locations
- Permanent sign installations
- Portable sign installations

PBS&J's engineers have identified, however, some concerns that require attention. Each is briefly described in the following paragraphs

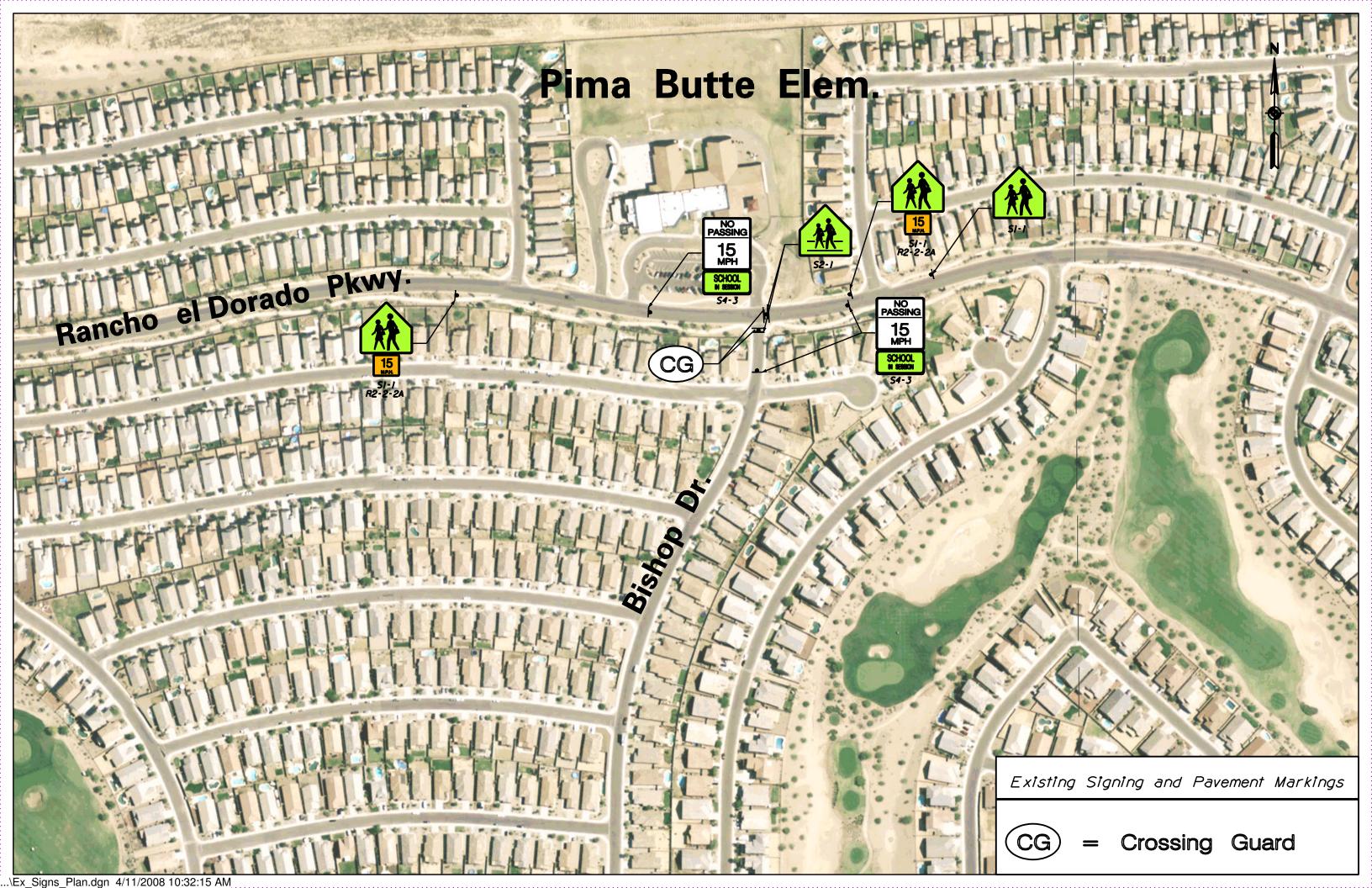
**Crosswalks.** All crosswalks in the City are currently white. To enhance visibility, to differentiate between school and other pedestrian crossings, and to elevate the drivers' perceived importance, the City should consider installing yellow crosswalks (10" line widths and 6' crosswalk width minimum) designated at locations designated as "school crossings." Yellow crosswalk lines have been installed by other jurisdictions in Arizona and have been adopted as ADOT's standard for school areas.

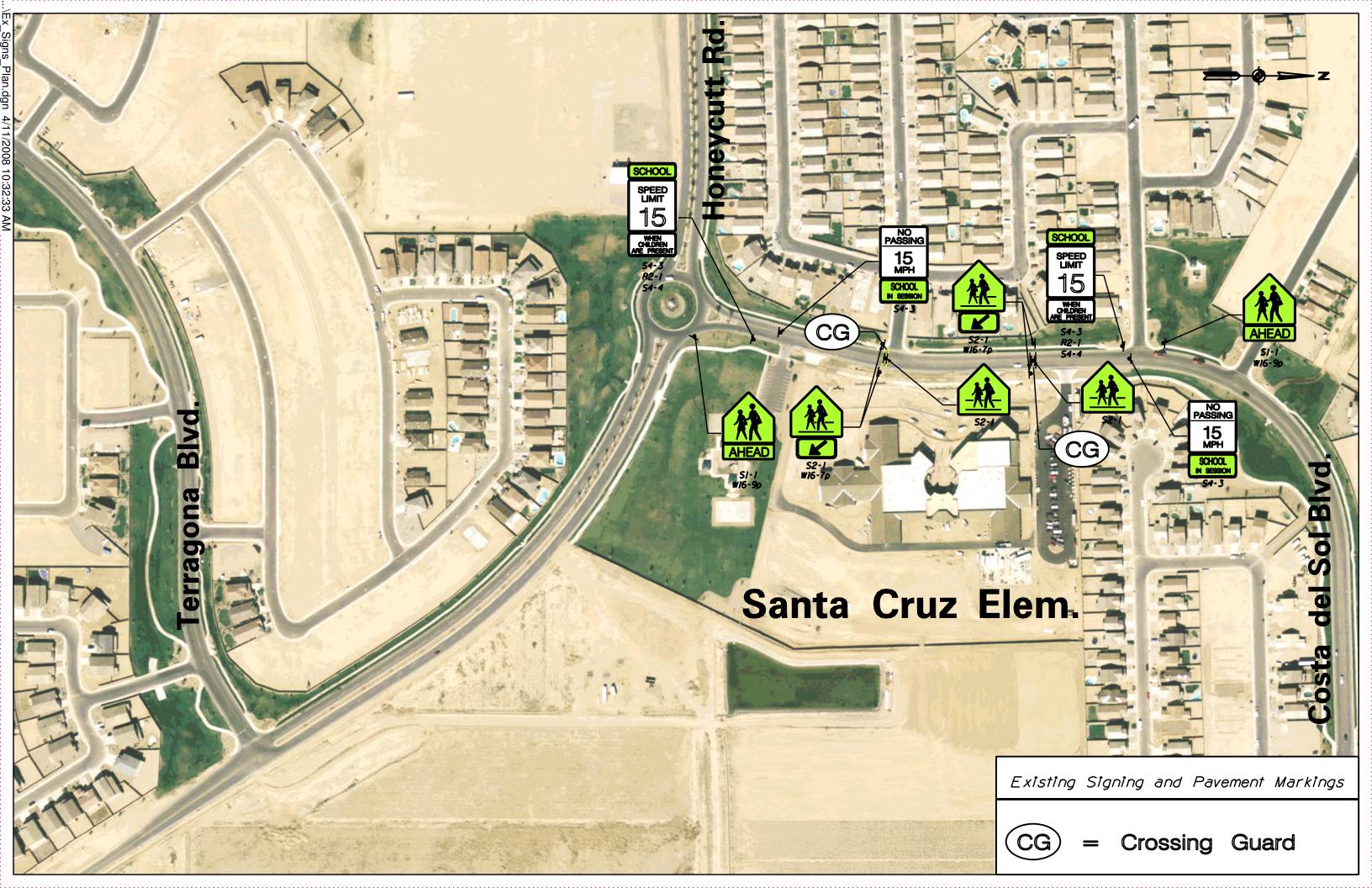
<sup>&</sup>lt;sup>a</sup> Traffic Safety for School Areas Guidelines 2006, Arizona Department of Transportation, 30-012, revised 07/06.

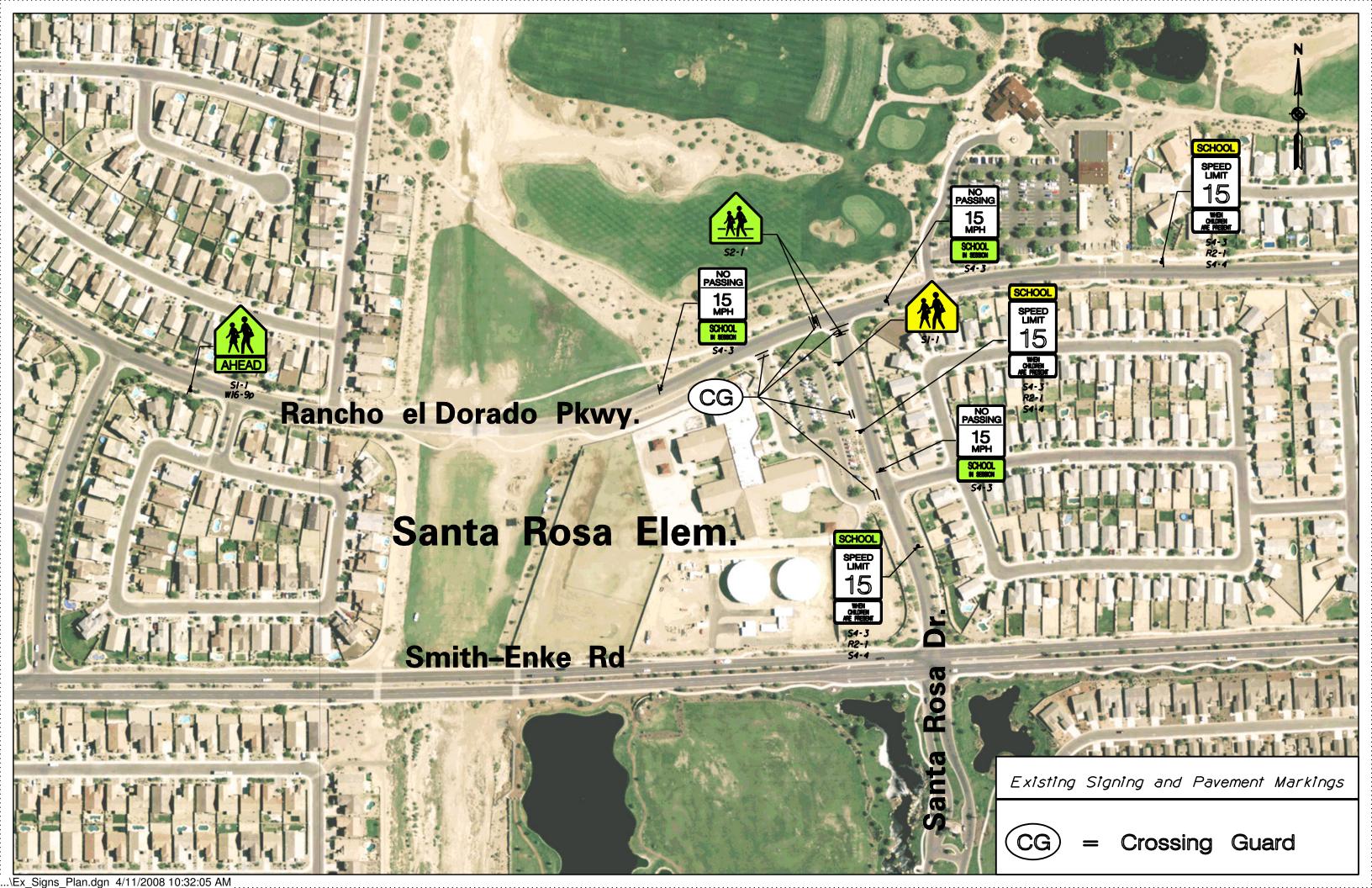




..\Ex\_Signs\_Plan.dgn\_4/11/2008\_10:31:49\_AM







Length of School Speed Zone and Conflicting Sign Messages. The MUTCD<sup>b</sup> suggests that the reduced speed zone should begin either at a point 200 feet from the crosswalk, or at a point 100 feet from the school property line, based on whichever is encountered first as traffic approaches the school. Given the distance between the school property line and school crossings at some of the MUSD schools and drivers' tendencies to ignore excessively long reduced-speed zones, the City should consider placement at 200 feet in advance of the crosswalk. The ADOT Guidelines recommend placement of the portable speed signs at a 75-foot minimum to 300-foot maximum in advance of the crosswalk. Where multiple closely-spaced crosswalks occur on a single roadway, a combined speed reduction zone may be appropriate.

PBS&J recommends that the City remove any supplementary speed advisory plates (R2-2) from the school advance warning signs (S1-1) in the vicinity of Pima Butte Elementary School. The temporary speed zones should be controlled by the portable signing.

The City should also remove the speed limit (R2-1) and "when children are present" supplementary plaque (S4-4) installations in the vicinity of Santa Cruz Elementary, Maricopa Elementary, and Maricopa Wells Middle Schools. Again, the speed zones should be controlled by the portable signing. Further, the message conveyed to the driver ("when children are present") conflicts with the absolute (nondiscretionary) speed shown on the portable signs.

**Portable Signing for Speed Zones.** All advance portable signing used for schools in the MUSD should conform to the ADOT Standard for Sign Code S4-5 (No Passing – 15 MPH – Fines Doubled – School in Session). All portable pedestrian crossing signs should conform to ADOT Standard for Sign Code S2-2 (Stop When Children in Crosswalk) and replace the existing portable signs that are being used at the crosswalks.

Note that, per both MUTCD and ADOT guidelines, S2-2 signs are not to be used on approaches that are controlled by a stop sign or traffic signal.

As the length of time that the portable signing remains continuously in place, the seriousness or urgency perceived by a driver decreases. PBS&J recommends that signs remain in the street only during the time period the crossing guards are present. A less desirable alternative would be to leave the portable signing in place on the collector streets for the duration of the school day (but still remove the portable signing from the arterial streets when the crossing guards are not present).

Graphic illustrations of the proposed signing and pavement marking plans for each school are provided beginning on page 14 of this memorandum.

#### Bicycle and Pedestrian Facilities

The City's adopted cross sections for local, collector, and arterial streets – combined with a focus on neighborhood schools – will significantly enhance the ability to provide safe walk- and bike-to-school routes. Over the past three years there have not been any vehicle-pedestrian or vehicle-bicycle accidents involving school-age children. Accident statistics should continue to be reviewed periodically to identify any potential problem locations that may arise.

Though some students do, walking and biking to school are not encouraged between Santa Cruz and the neighborhood located south of Honeycutt, southeast of the school. Given the proximity of this neighborhood to the school, PBS&J proposes the addition of a school crossing (with crossing guard) just northwest of the intersection of Honeycutt Road and Terragona Boulevard. This will provide a safe means of encouraging walking and biking from the neighborhood via a crossing located well away from the existing roundabout at Honeycutt Road and Costa del Sol Boulevard

The proposed additional crossing is included in the graphic illustrations of the proposed signing and pavement marking plans beginning on page 14 of this memorandum.

<sup>&</sup>lt;sup>b</sup> Manual on Uniform Traffic Control Devices, Federal Highway Administration, 2003, revised 12/2007.

Among the comments received in the Parents Survey responses as well as at the SR2S Open House were several related to the lack of sufficient and safe bicycle storage. More specifically:

- Santa Cruz Elementary School has no provisions for bicycle storage and students who do ride their bikes to/from school often chain them to the security fencing at the front of the school
- Pima Butte Elementary School's bicycle storage capacity is often exceeded and overflow bikes are parked along the fence adjacent to the faculty parking area
- Parents would prefer to see bicycle storage areas which provide racks rather than a caged facility in which bikes often end up piled on top of each other

PBS&J recommends that MUSD seriously consider the provision of upgraded bicycle storage at all schools as a means of further encouraging biking to school.

#### School Site / Street Interface

Given the high percentage of students arriving and departing school via family cars or carpools, pick-up and drop-off operations often overwhelm the on-site capacity for such activities at each school. While site enhancements may reduce the problem, such infrastructure improvements would likely be prohibitively expensive. PBS&J recommends less expensive alternatives, including:

- Enthusiastic support and publicity for the SR2S Program with the goal of increasing the number of students walking and biking to/from school and, consequently, reducing the number of private vehicles in the vicinity of the school
- Curb restrictions achieved by painting (see Section 4 and 7 of the *Framework*) and progressive enforcement of the restrictions
- Locate and design new schools in accordance with generally accepted practices discussed in Section 7 of the *Framework* and the soon-to-be-released (2008) ITE Technical Committee Report on *School Site Planning, Design, and Transportation*.

In locations where these lower-cost solutions do not achieve the desired results, the City, in cooperation with MUSD, should engage in a formal engineering study to identify the specific causes of the problem and the range of alternative solutions.

#### Other Issues and Concerns

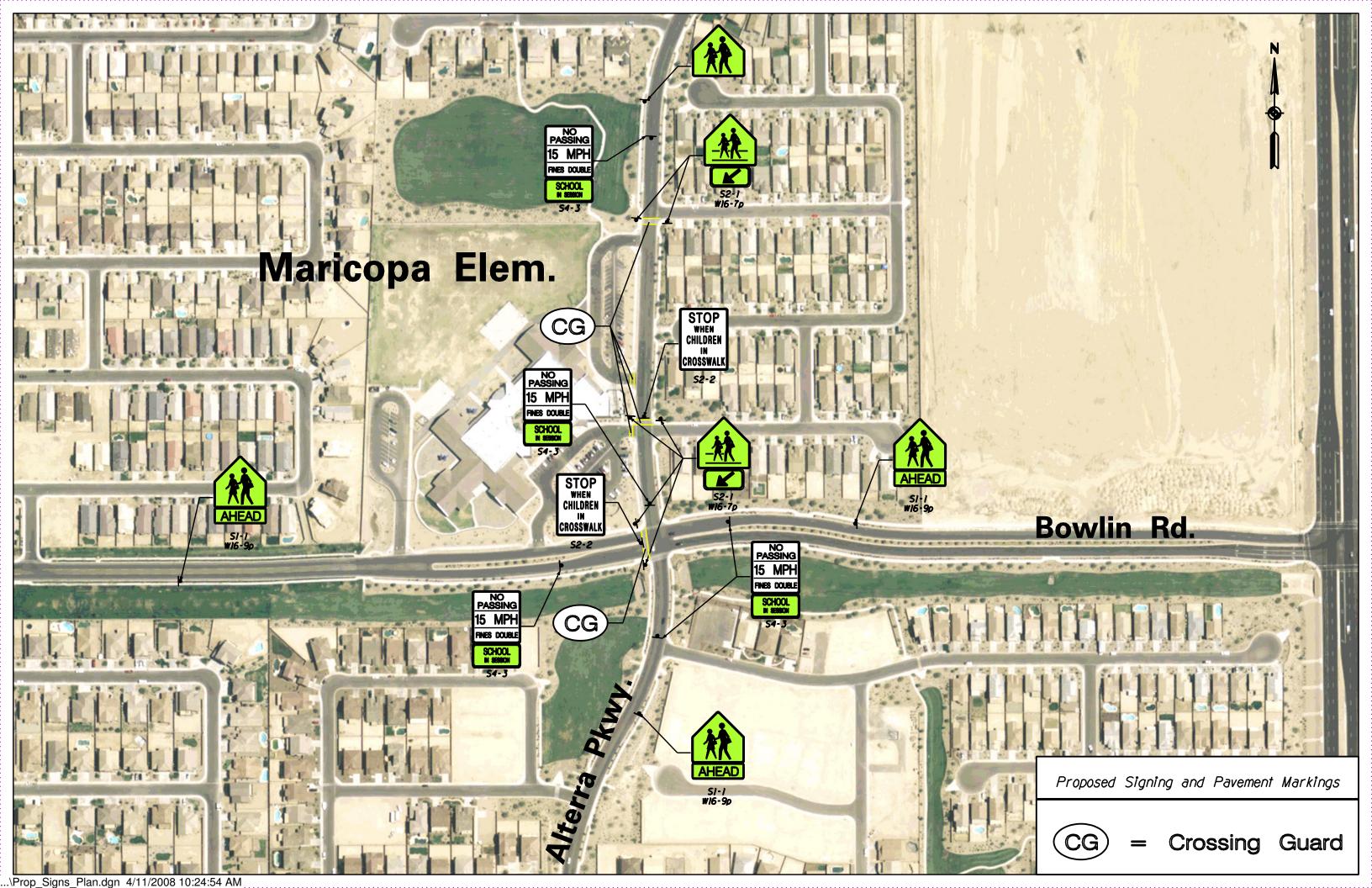
Other non-categorized issues and concerns are addressed in the following paragraphs.

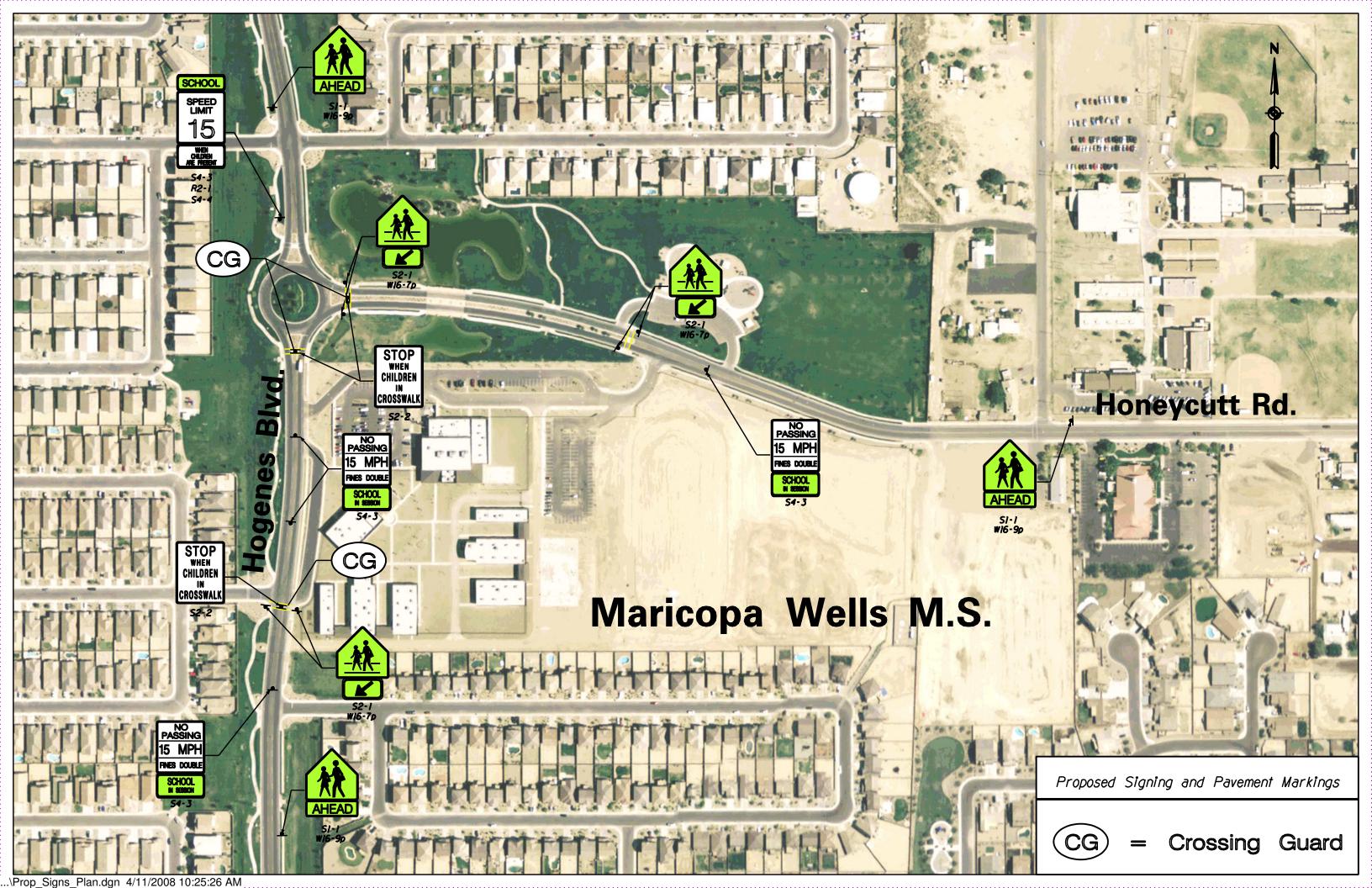
**Route Maps.** Preliminary walk- and bike-to-school route maps have been developed for each school and are provided in Attachment 3. These draft maps should be carefully reviewed by the City and MUSD to ensure accuracy and consistency with policy and procedures. Updated route maps should be developed as school attendance boundaries change.

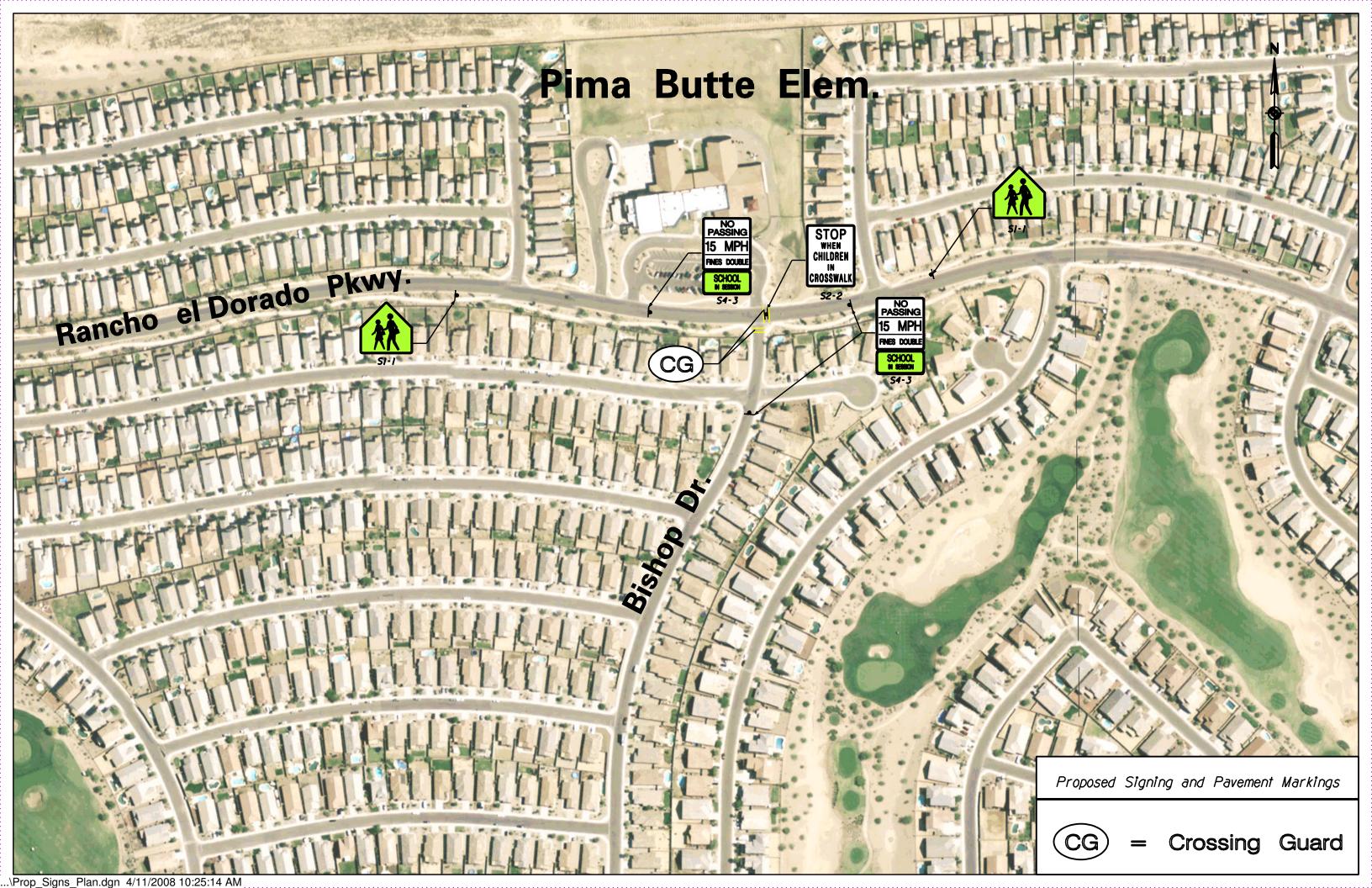
**Non-Compliance with School Zone Speeds.** If the in-street portable speed signing and shortened speed zone lengths do not enhance compliance in the vicinity of the school crossings, additional engineering and/or enforcement measures may be warranted. In particular, enhanced signing might include:

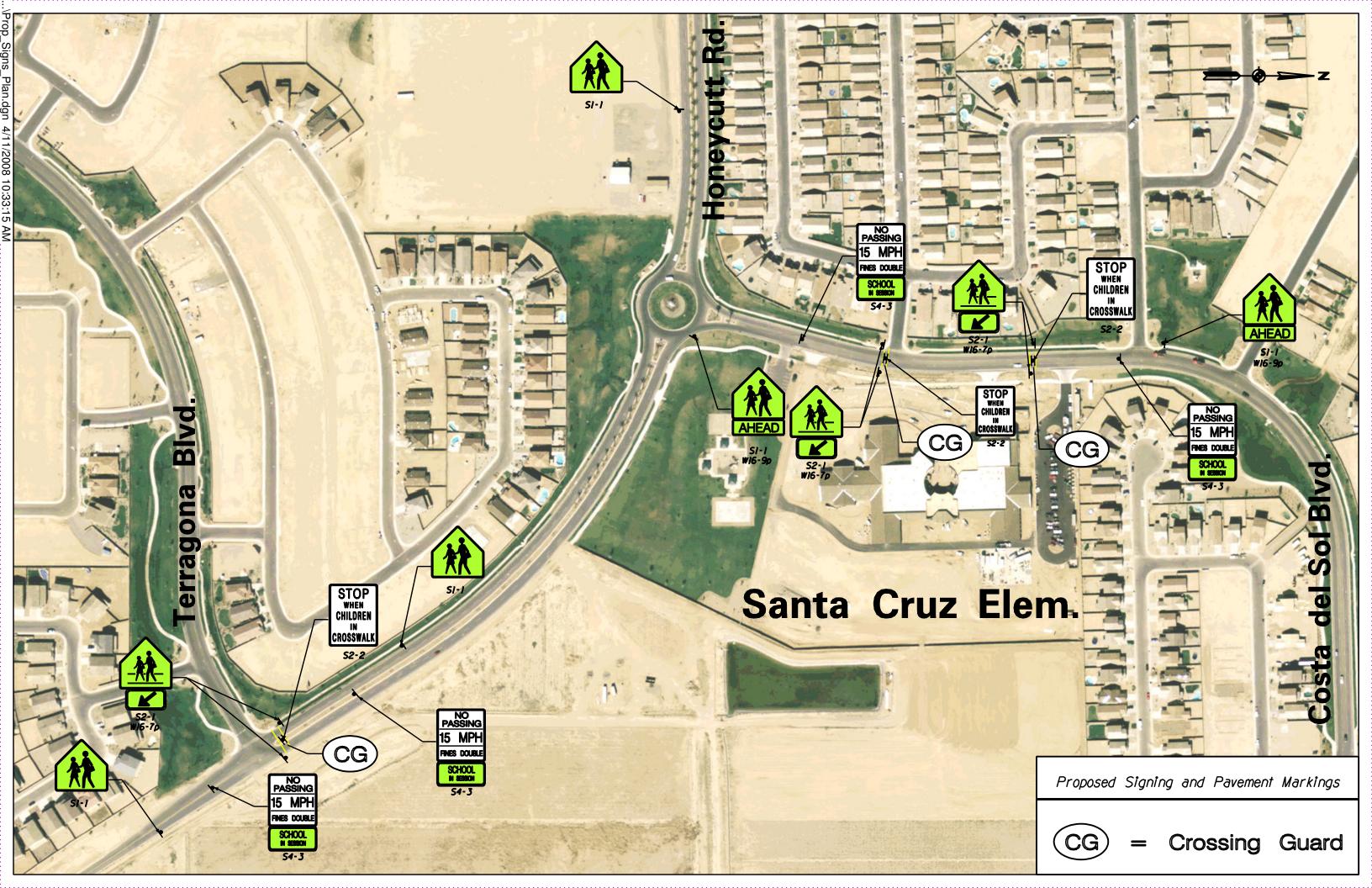
- Signs with flashing beacons indicating that the speed is 15mph when flashing
- Similar to above with the addition of driver feedback signing to inform the driver what his actual speed is

Information on both of these options is contained in the engineering subsection of Section 4 of the *Framework*.









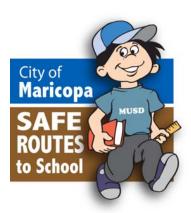


#### SUMMARY OF RECOMMENDATIONS

Based on the engineering evaluation, PBS&J recommends the following actions on the part of the City and MUSD:

- ✓ The City should adhere to the signing and marking standards presented in the MUTCD or ADOT's *Traffic Safety for School Areas Guidelines 2006*. These include, but are not limited to:
  - Yellow crosswalk markings at designated school crossings
  - School speed zone locations and lengths
  - Locations of portable school zone signs
  - · High-reflectivity fluorescent yellow-green signing
- ✓ To enhance visibility and draw greater attention to the school zones, the City should augment existing and future school area signing with the fluorescent yellow-green sign post covers.
- ✓ Upon its release (later in 2008), the City and MUSD should endorse the guidelines contained in ITE Technical Committee ReportTENC-105-0: *School Site Planning, Design, and Transportation* for the purposes of planning and designing future schools. A copy of those guidelines should be inserted, upon their release, in Section 7 of all copies of the *Framework*.
- ✓ As budgets permit, the City should upgrade the signing and pavement markings at existing schools in accordance with the proposed layouts provided in this report.
- ✓ MUSD should only locate portable signs in the street during times when crossing guards are present. Less desirably, portable signs may remain on collector and local streets for the duration of the school day.
- ✓ The City of Maricopa Police Department should continue to periodically review vehicle-student and vehicle-bike accident history to identify potential problem areas and notify the City's Transportation Director or SR2S Coordinator of those locations for further study.
- ✓ MUSD should provide and/or upgrade, as required, bicycle storage facilities at all elementary and middle schools.
- ✓ MUSD should evaluate the potential of providing additional access to the Maricopa Wells Middle School property along the eastern property line in an effort to encourage more bicycling and walking from the neighborhoods to the east and southeast of the school.
- ✓ The City and MUSD should add a pedestrian crossing and crossing guard as well as the requisite advance and portable signing at the intersection of Honeycutt and Terragona to encourage walking and bicycling from the neighborhoods south of Honeycutt, southeast of Santa Cruz Elementary School.
- ✓ The City and MUSD should enthusiastically support the SR2S Program and participation therein by the community and students.

Attachment 1
Parents Survey



### ENCUESTA SOBRE CAMINAR Y ANDAR EN BICICLETA A LA ESCUELA - PARA PADRES -

#### Querido padre o proveedor de cuidados:

La escuela de su hijo quiere saber qué piensa usted sobre la idea de que sus hijos caminen y anden en bicicleta para ir a la escuela. Le tomará aproximadamente entre 10 y 15 minutos contestar esta encuesta. Les pedimos a las familias que completen sólo un cuestionario por escuela a la que asisten sus niños. Si más de un niño trae a casa un formulario de la misma escuela, por favor complete la encuesta del niño que cumpla años en la fecha más próxima al día de hoy.

Luego de completar esta encuesta, devuélvala a la escuela a través de su hijo o entréguesela a la maestra. Se mantendrá confidencialidad en sus respuestas y no se asociará su nombre ni el de su hijo a ningún resultado. ¡Gracias por participar en esta encuesta!

	erde, toda la informac mación que lo pueda id	ión se mantendrá confidenci entificar.	ial y n	o se d	ará a conocer	ningún tipo de			
1.	¿En qué grado está e	I niño que trajo esta encue:	sta a	casa?	(K – 8)	grado			
2.	¿El niño que trajo a casa la encuesta es varón o mujer? 🔲 VARÓN 🔲 MUJER								
3.	¿Cuántos niños tiene	usted entre Kindergarten y	/ el 8\	o gra	do?	_ niños			
4.	. ¿Cuál es su código postal? (por favor escriba su código postal + 4 otros números si los sabe) código postal (nota: muchas cuentas de servicios detallan su código postal completo)								
5.	¿A qué distancia vive	su niño de la escuela? (elij	a una	respue	sta)				
	a. menos de 1/4	4 de milla		d. de 1	milla a 2 millas				
	☐ b. de 1/4 milla a	a 1/2 milla		e. Más	de 2 millas				
	☐ c. 1/2 milla a 1	milla		. No l	o sé				
6.	La mayoría de los	Llegar a la escuela		Т	Llegar a l	la casa			
	días, ¿cómo va su a Caminando a Caminando								

Caminando

c. Autobús escolar

d. Vehículo de la familia (sólo

Compartiendo el viaje en carro

Medios públicos (autobús de

la ciudad, subterráneo, etc.)

con niños de otras familias

con niños de la familia)

g. Otro (patineta, monopatín,

patines, etc.)

b. Bicicleta

Estas primeras preguntas son sobre información en general y de antecedentes.

a. Caminando

Autobús escolar

d. Vehículo de la familia (sólo

e. Compartiendo el viaje en carro

con niños de otras familias

Medios públicos (autobús de

la ciudad, subterráneo, etc.)

con niños de la familia)

g. Otro (patineta, monopatin,

patines, etc.)

Bicicleta

niño a la escuela y

cómo regresa a la

escuela? (elija, con

un círculo, una

respuesta por

columna)

casa después de la

7. Normalmente,	Trayecto a la escuela		Trayecto desde la escuela					
¿cuánto tiempo le lleva a su niño el trayecto para ir y regresar de la escuela? (marque una respuesta por columna)	□ a. Menos de 5 n □ b. 5 a 10 minuto □ c. 11 a 20 minut □ d. Más de 20 mi □ e. No lo sé / No seguro/a	s os nutos	□ b. 5 □ c. 11 □ d. M	enos de 5 minutos a 10 minutos l a 20 minutos ás de 20 minutos o lo sé / No estoy				
8. En el último año, ¿su hijo le ha pedido permiso para caminar o andar en bicicleta para ir a regresar de la escuela? (marque una respuesta) ☐ SÍ ☐ NO								
<ol> <li>¿En qué grado de la escuela dejaría que su hijo caminara o usara la bicicleta para ir a/regresar de la escuela sin la supervisión de un adulto? (seleccione un grado entre K y 8)</li> <li>Grado (K a 8) (o □ No me sentiría cómodo/a en ningún grado)</li> </ol>								
<ol> <li>¿Cuál de los siguiente su decisión de dejar, o hijo caminara o usara a/regresar de la escuel (marque todas las que con</li> </ol>	no dejar, que su la bicicleta para ir la?	11. ¿Probablemente dejaría que su hijo caminara usara la bicicleta para ir a /regresar de la escuela si este problema cambiara o mejorara (elija, con un circulo, una respuesta por línea) ( Mi hijo ya camina o usa la bicicleta para ir a/regresar de la escuela)						
☐ Distancia		sí	NO	No estoy seguro/a				
☐ Conveniencia de mane	ejar	sí	NO	No estoy seguro/a				
☐ Tiempo		sí	NO	No estoy seguro/a				
☐ Participación del niño tiene antes y después	•	sí	NO	No estoy seguro/a				
☐ Velocidad del tráfico en e	el trayecto	sí	NO	No estoy seguro/a				
☐ Cantidad de tráfico en el	trayecto	sí	NO	No estoy seguro/a				
☐ Adultos con quien car bicicleta	ninar o andar en	sí	NO	No estoy seguro/a				
☐ Aceras o caminos		sí	NO	No estoy seguro/a				
☐ Seguridad de las inter	secciones y cruces	sí	NO	No estoy seguro/a				
☐ Guardias de cruce pea	tonal	sí	NO	No estoy seguro/a				
☐ Violencia o crimen		sí	NO	No estoy seguro/a				
☐ Tiempo o clima		sí	NO	No estoy seguro/a				
□ Otro		sí	NO	No estoy seguro/a				
□ Otro		sí	NO	No estoy seguro/a				

12. En su opinión, ¿c bicicleta para ir a/		esalienta la escuel cuela? <i>(marque ur</i>		ninar y usar la		
Totalmente alienta	Alienta	Ninguno	Desalienta	Definitivamente desalienta		
	bre el hecho de	que su hijo camine	o ande en bicicl	n sus sentimientos (o lo eta para ir a/regresar o sar de la escuela.		
13. ¿Qué tan DIVERTI escuela? (marque		ijo caminar o anda	r en bicicleta para	ir a /regresar de la		
Muy divertido	Divertido	Neutral	Aburrido	Muy aburrido		
14. ¿Qué tan SALUDA escuela? (marque Muy saludable		nijo camine o ande Neutral	en bicicleta para Malo para la	ir a /regresar de la Muy malo para la		
wuy saluuable	Jaiouable	rveduai	salud	salud		
15. (a) ¿Cuantos años completos de educación regular ha terminado usted? años (De escuela primaria a escuela de post grado) (b) ¿Cuántos años ha completado su esposo/a/ compañero/a? (si corresponde) años  16. Por favor escriba comentarios adicionales en el espacio de abajo (use el revés de esta hoja, de ser necesario):						
			-			
!Gracias por participar en esta encuesta!						
¿Interesado/a en saber más? Si usted está interesado/a en discutir las condiciones referentes a las actividades de caminar o andar en bicicleta para ir a/regresar de la escuela de su hijo, por favor escriba su información abajo (¡No se asociará su nombre con los resultados de esta encuesta!):						
Nombre:		Direcció	n:			
Correo electrónico:						

Teléfono:

Página 1 de 3 Página 3 de 3 Página 2 de 3



## SURVEY ABOUT WALKING AND BIKING TO SCHOOL - FOR PARENTS -

#### Dear Parent or Caregiver,

one choice per

column)

and leave for home

after school? (circle

School Bus

Family vehicle (only with

children from your family)

Transit (city bus, subway, etc.)

Other (skateboard, scooter,

e. Carpool (riding with children

from other families)

inline skates, etc.)

Your child's school wants to learn your thoughts about children walking and biking to school This survey will take about 10 - 15 minutes to complete. We ask that each family complete only one survey per school your children attend. If more than one child from a school bring survey home, please fill out the survey for the child with the next birthday from today's dat

After you have completed this survey, send it back to the school with your child or give it t teacher. Your responses will be kept confidential and neither your name nor your child's n will be associated with any results. Thank you for participating in this survey!

	gather some general and will be confidential, and no		-		e released.		
1. What is the grade of	the child who brought hom	e thi	s s	urvey? (K – 8)	grade		
2. Is the child who brought home this survey male or female?							
3. How many children of	3. How many children do you have in Kindergarten through 8 <sup>th</sup> grade? children						
	What is your ZIP Code? (please provide ZIP +4 if known) ZIP code (note: many utility bills will show your ZIP +4)						
5. How far does your ch	nild live from school? (choo	se on	e)				
a. less than 1/4	mile		d.	1 mile up to 2 miles			
☐ b. 1/4 mile up t	o 1/2 mile		e.	More than 2 miles			
☐ c. 1/2 mile up t	o 1 mile		f.	Don't know			
On most days, how does your child arrive at school     and leave for home	Arrive at school a. Walk b. Bike			Leave for ho a. Walk b. Bike	me		

c. School Bus

d. Family vehicle (only with

e. Carpool (riding with children

n walking and biking to school.
sk that each family complete
one child from a school brings a
ext birthday from today's date.
ol with your child or give it to the
our name nor your child's name
ing in this survey!
information. nformation will be released.
or marion will be released.
y? (K – 8) grade
☐ MALE ☐ FEMALE
grade? children
ZIP code
e up to 2 miles
e than 2 miles t know
Leave for home
Walk Bike
School Bus
Family vehicle (only with children from your family)
Carpool (riding with children
from other families) Transit (city bus, subway, etc.)
Other (skateboard, scooter, inline skates, etc.)
mine shares, etc.)

7.	How long does it	Travel time to se	chool	Travel time from school					
	normally take your child to get to/from school? (check one choice per column)	a. Less than 5 minutes b. 5 - 10 minutes c. 11 - 20 minutes d. More than 20 minutes e. Don't know / Not sure		a. Less than 5 minutes b. 5 - 10 minutes c. 11 - 20 minutes d. More than 20 minutes e. Don't know / Not sure		utes nutes 20 minutes			
8.	. Has your child asked you for permission to walk or bike to/from school in the last year? (check one box)								
9.	At what grade would (select a grade between	you allow your child to K-8)	o walk or bil	e without	an adult	to/from school?			
	Grade (K-8) (or ☐ I would not feel comfortable at any grade)								
10.	Which of the following issues affected your decision to allow, or not allow, your child to walk or bike to/from school?      (check all that apply)      (check all that apply)  11. Would you probably let your child walk or bike to/from school if this problem were changed or improved?      (circle one per line)      (□ My child already walks or bikes to/from school)								
	Distance			YES	NO	Not Sure			
	Convenience of driving	ng		YES	NO	Not Sure			
	Time			YES	NO	Not Sure			
	Child's participation i activities	n before/after-school		YES	NO	Not Sure			
	Speed of traffic along	route		YES	NO	Not Sure			
	Amount of traffic alor	ng route		YES	NO	Not Sure			
	Adults to walk or bike	with		YES	NO	Not Sure			
	Sidewalks or pathway	ys .		YES	NO	Not Sure			
	Safety of intersection	s and crossings		YES	NO	Not Sure			
	Crossing guards			YES	NO	Not Sure			
	Violence or crime			YES	NO	Not Sure			
	Weather or climate			YES	NO	Not Sure			
	Other			YES	NO	Not Sure			
	Other			YES	NO	Not Sure			
	biking to/from schoo		's school en	courage o		rage walking and			
_					-3-				

(Questions 13 and 1- your child has told y your child actually w	ou) about your c	hild walking or bi		
13. How much FUN is	walking or bikin	g to/from school f	for your child? (che	eck one box)
Very Fun	Fun	Neutral	Boring	Very Boring
14. How HEALTHY is	walking or biking	g to/from school f	or your child? (che	ck one box)
Very Healthy	Healthy	Neutral	Unhealthy	Very Unhealthy
15. (a) How many full (b) Your spouse/p		(grade school thro	ugh graduate school)	years
16. Please provide an	y additional com	ments below (use	the back of this p	age, if needed):

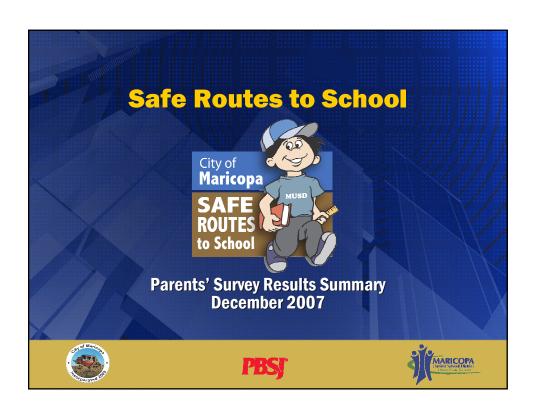
Intere	estea in	Lean	nıng	more:

If you are interested in discussing the conditions related to walking or biking to your child's school, please provide your contact information below (Your name will not be associated with the results of this survey!):

Thank you for participating in this survey!

lame: _			 	
mail:	 	 		_
ddress:	 			
hone:				

# Attachment 2 Parents Survey Results

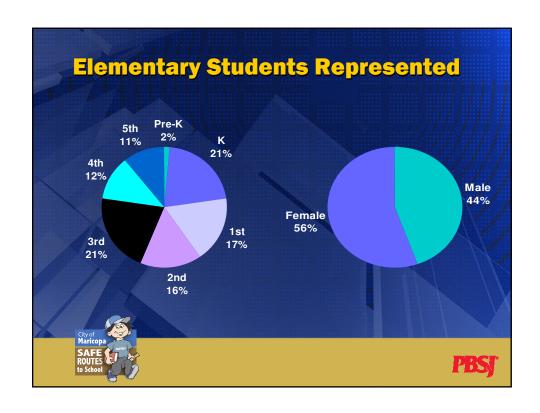


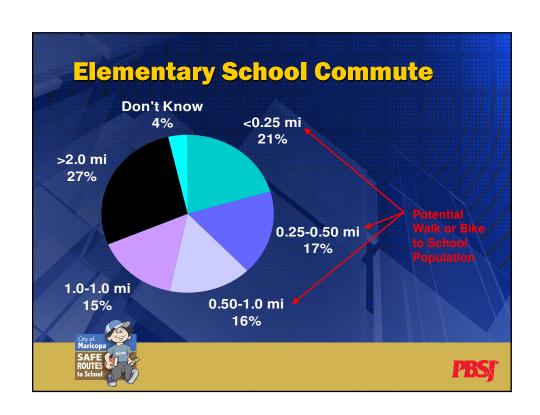
## **SR2S Parents' Survey**

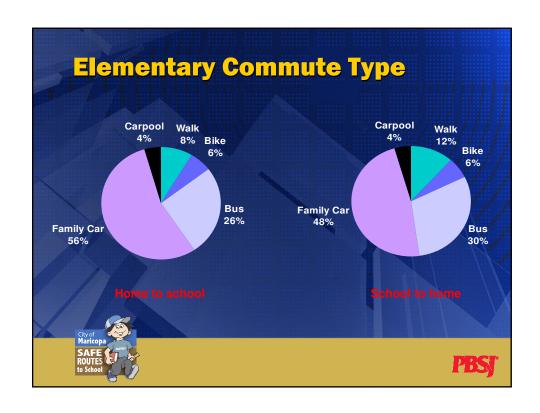
- Distributed on December 14<sup>th</sup> to all MUSD elementary and middle school students
- 471 surveys completed and returned by December 21<sup>st</sup>
  - 459 from Elementary Schools (K-5)
  - 12 from Middle School (6-8)
- Results summary focuses on elementary schools, representing 834 students

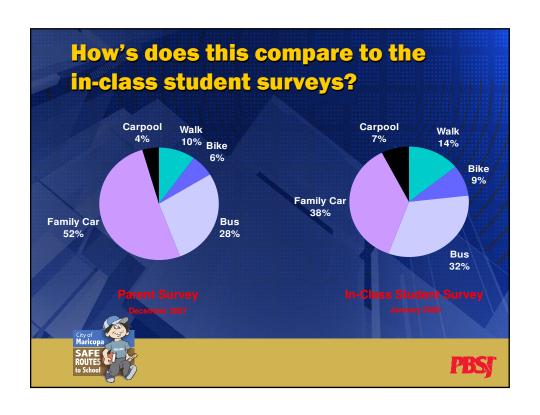


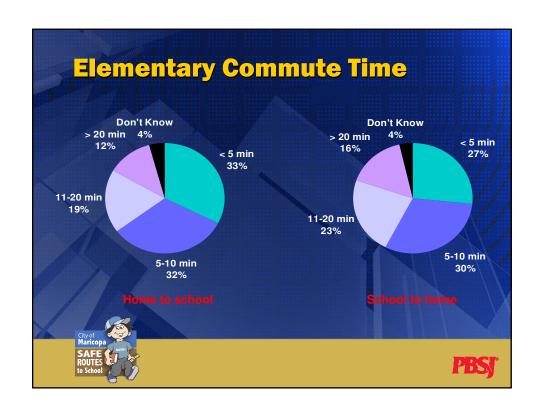




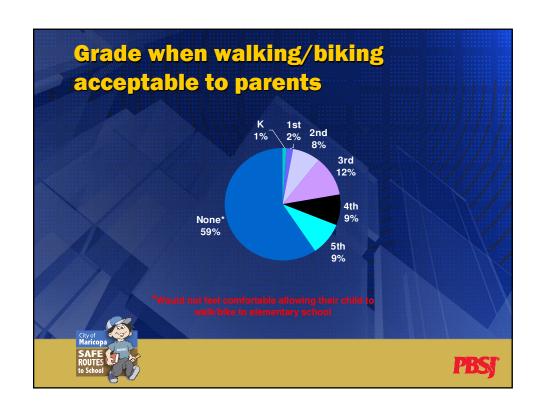


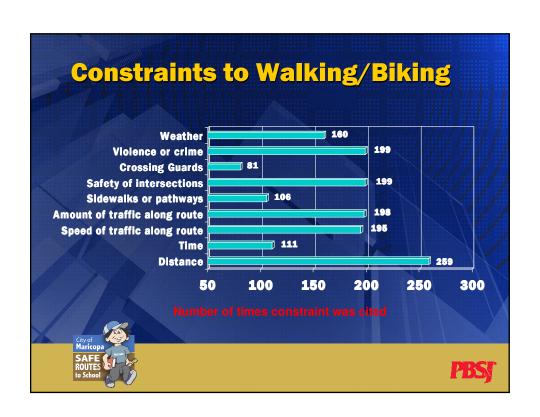


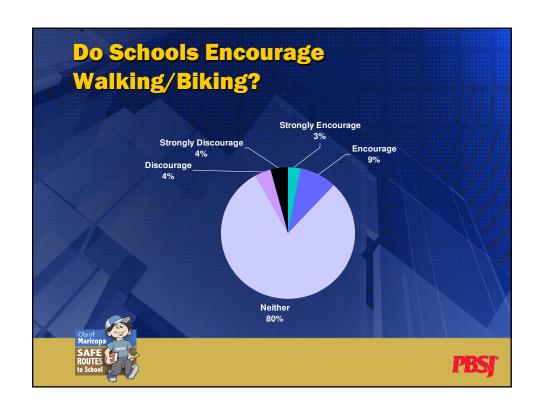


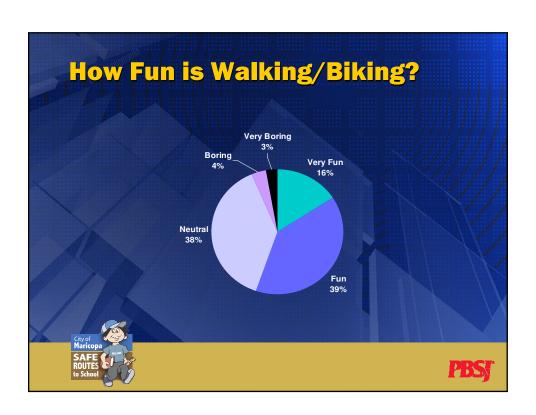


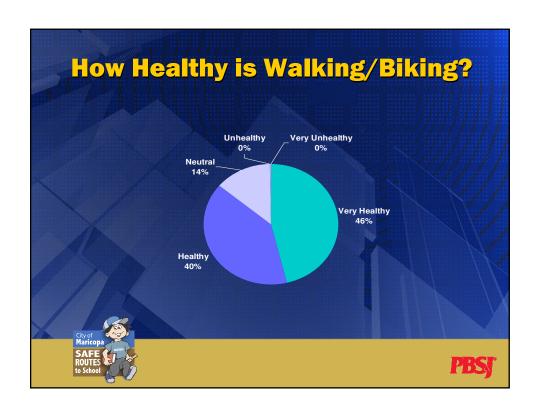












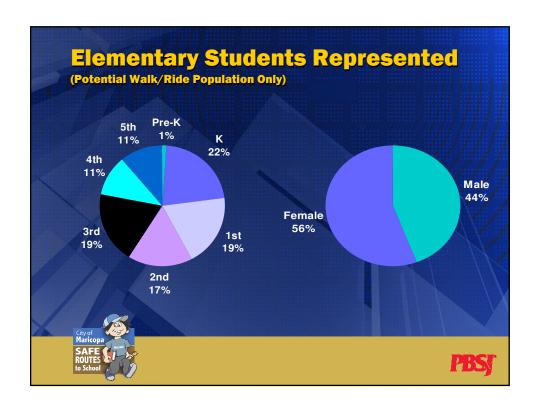


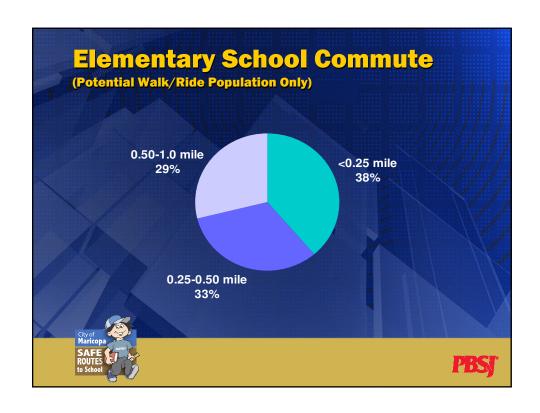
# Narrowing the Analysis Walking and biking to school is not as feasible when the distance from home to school exceeds one mile

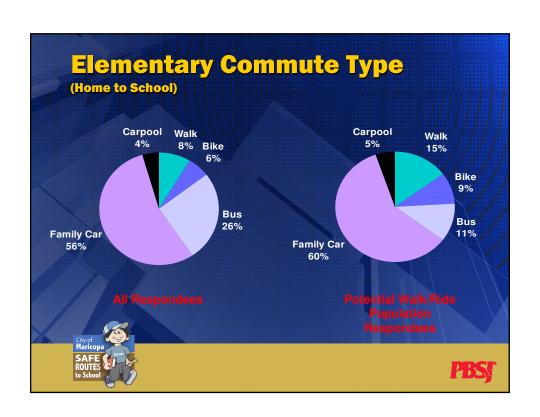
 How do the walking/biking summary statistics change when only students living within one mile of the school are considered?

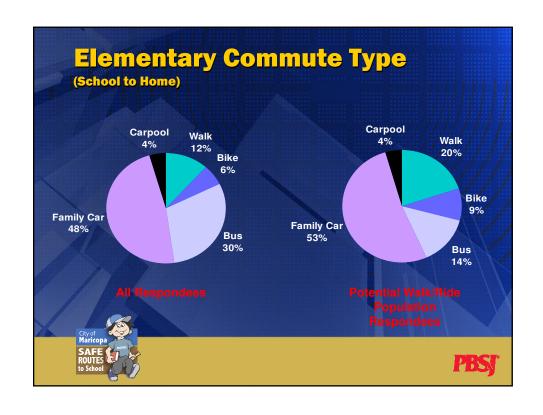


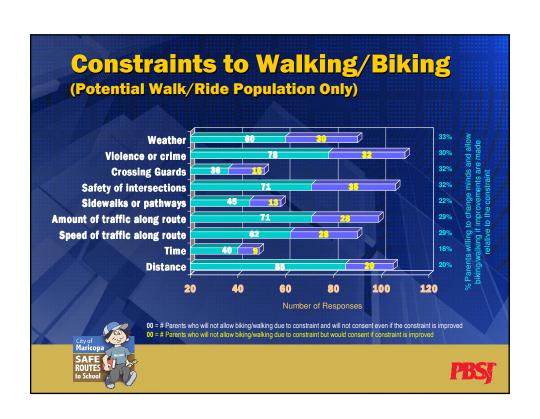
**PBS** 



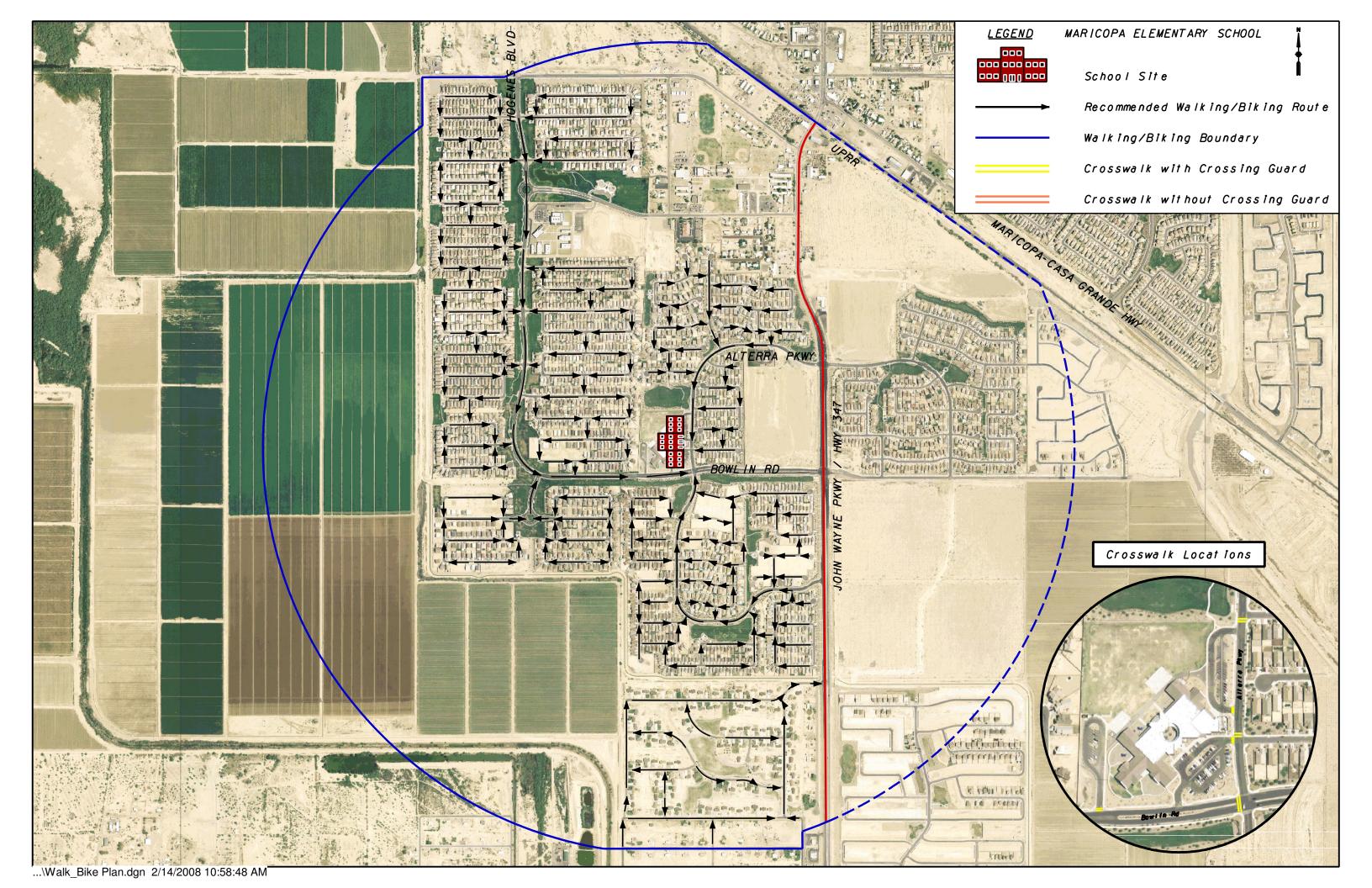


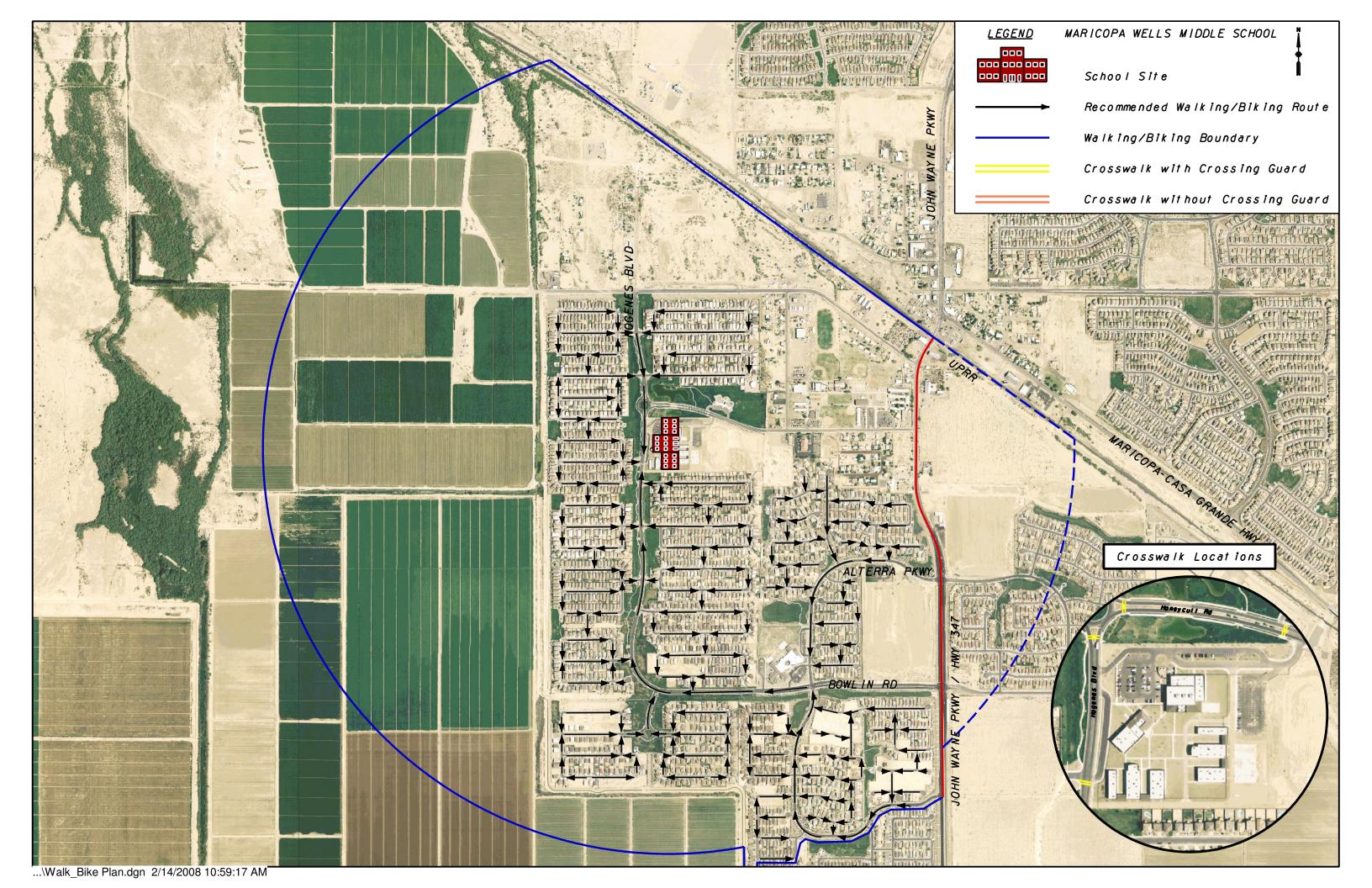


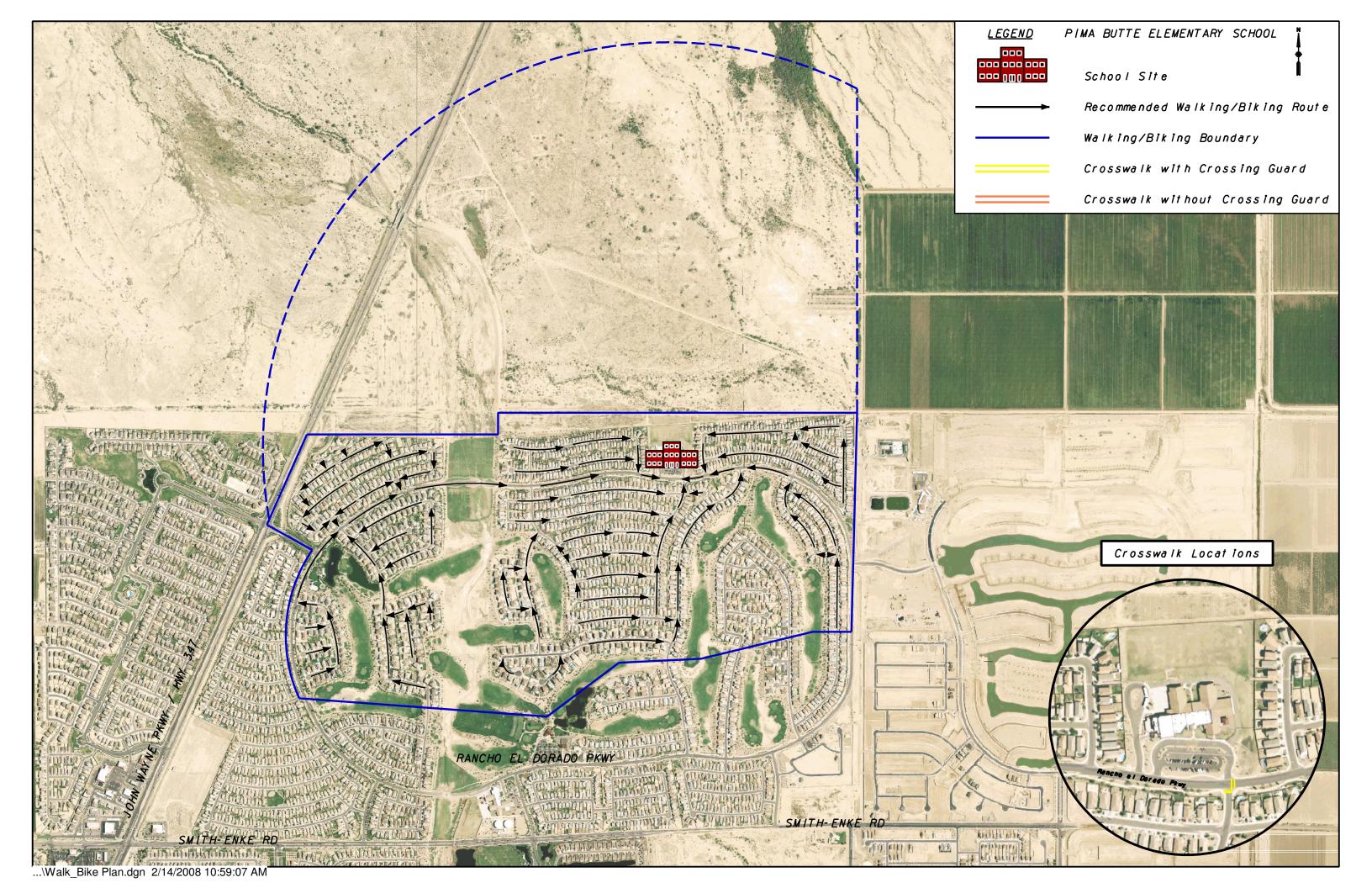


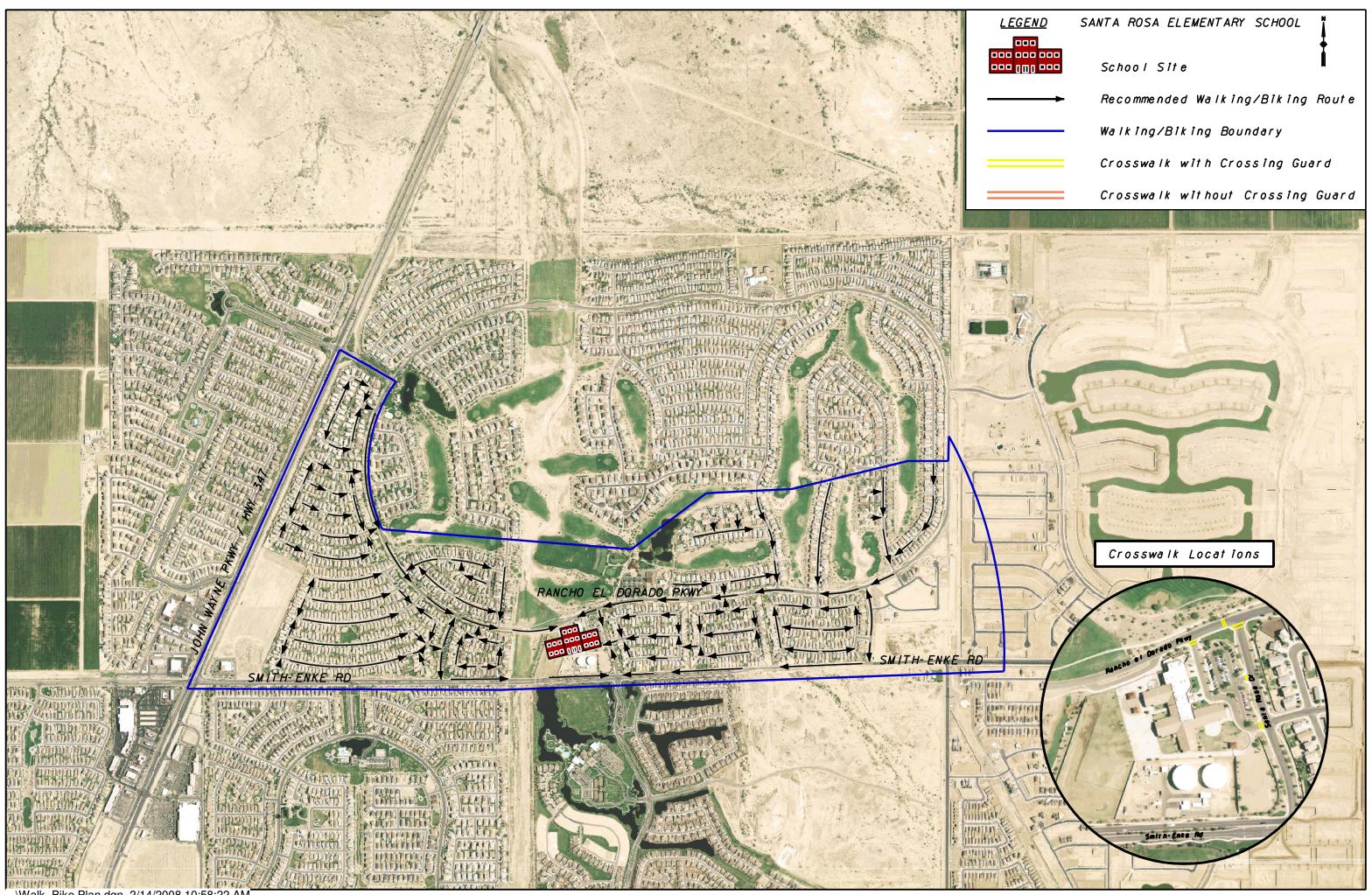


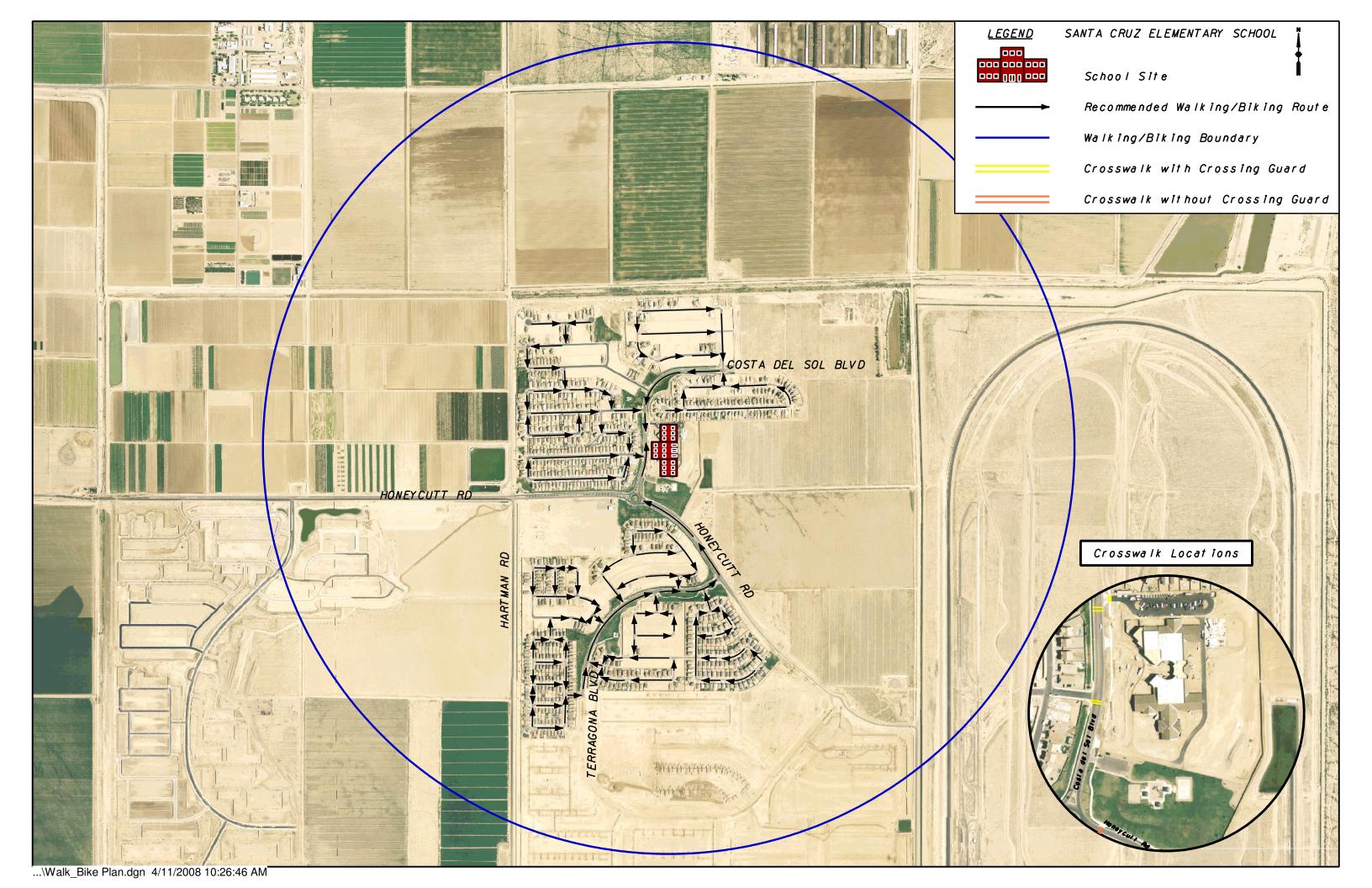
# Attachment 3 Walk- and Bike-to-School Route Maps











City of Maricopa Safe Routes to School Engineering Assessment and Community Attitudes Assessment March 2008

# Attachment 4 ADOT Guidelines Appendix A: School Crossing Signs and Markings

# APPENDIX A SCHOOL CROSSING SIGNS AND MARKINGS

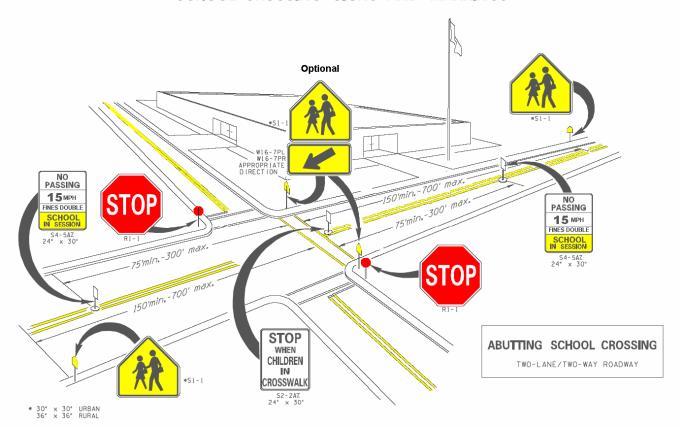
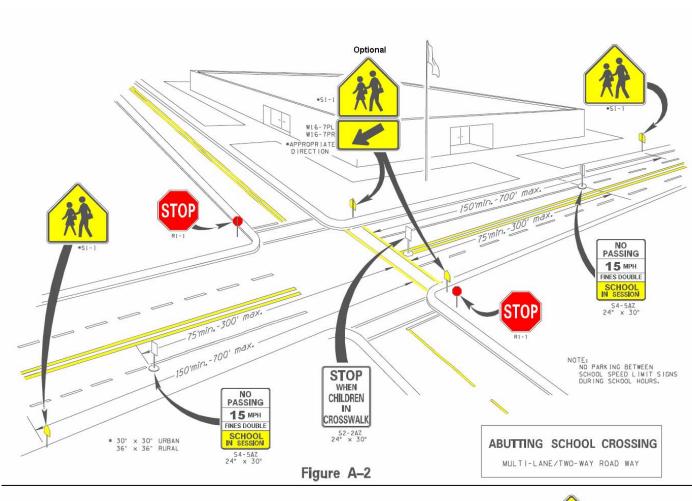
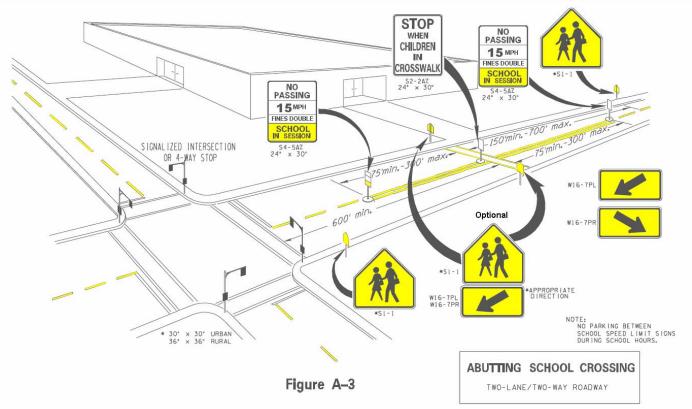


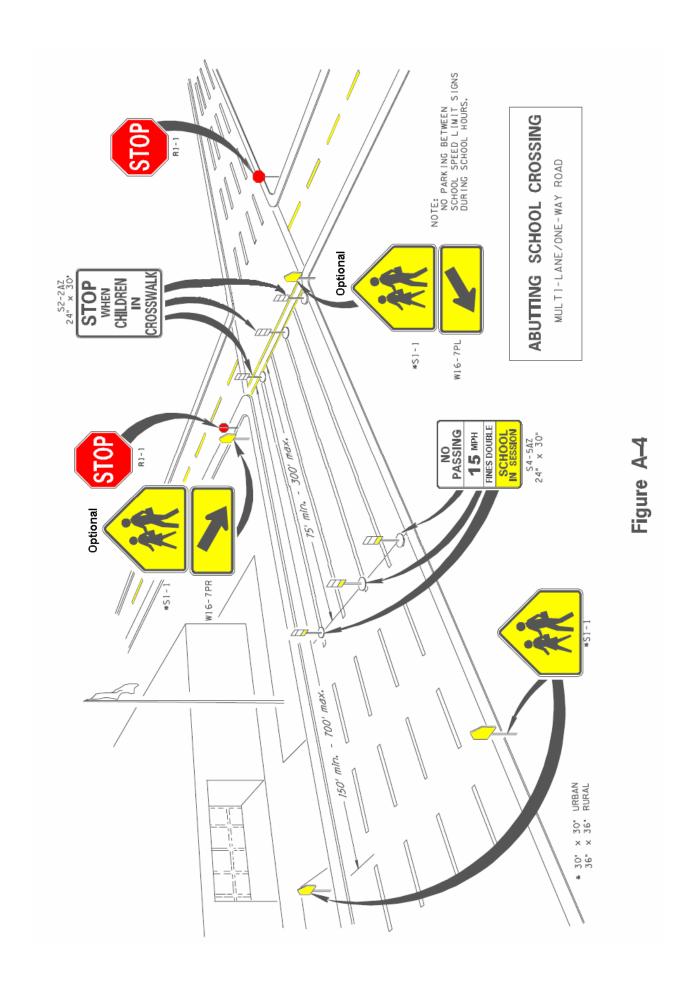
Figure A-1

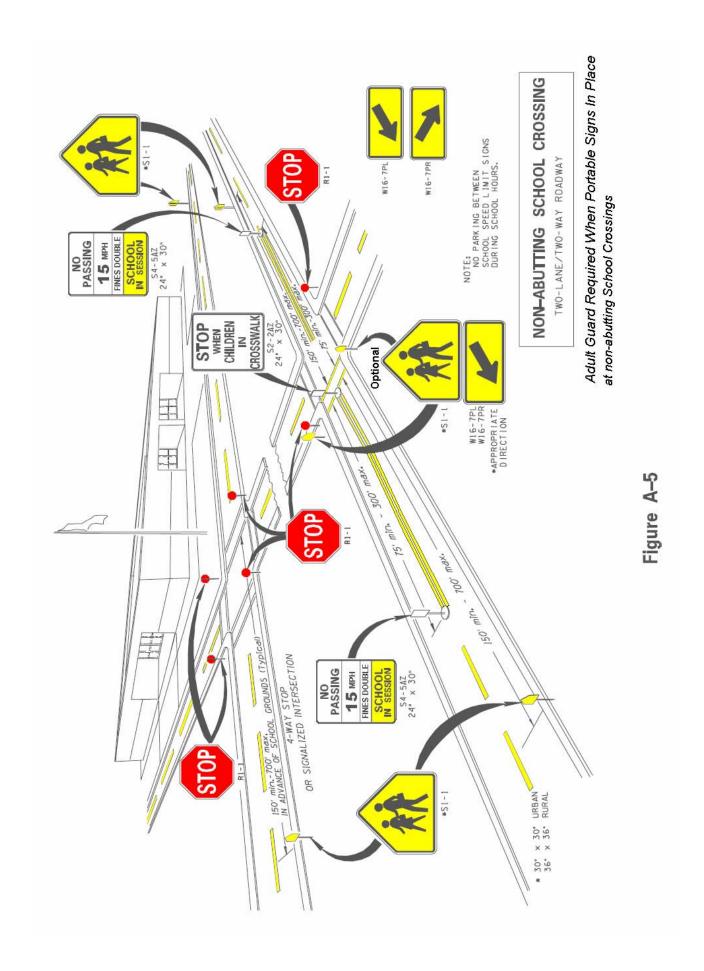
#### NOTES:

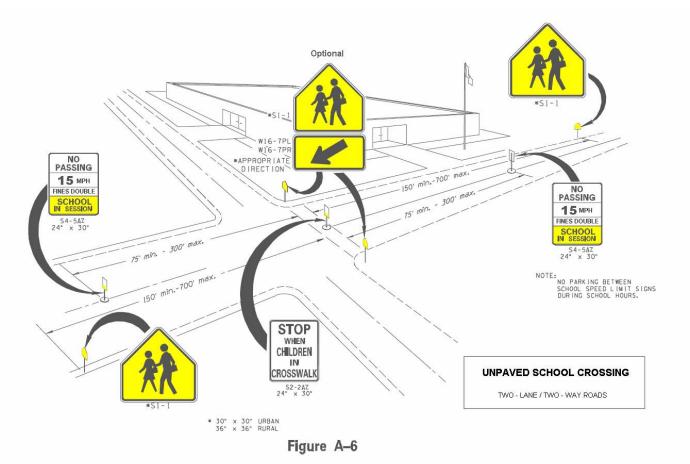
- NO PARKING BETWEEN S4-5AZ SIGNS DURING SCHOOL HOURS.
- NO SCHOOL CROSSINGS PERMITTED AT CROSSWALKS CONTROLLED BY STOP SIGNS.
- PORTABLE SCHOOL CROSSING SIGNS (S2-2AZ AND S4-5AZ ) MAY BE REDUCED IN WIDTH TO 20" WHEN USED ON URBAN STREETS.
- LANE LINES IN ADVANCE OF MARKED CROSSWALKS OF ANY TYPE MAY BE MADE SOLID AND SLIGHTLY WIDER THAN TYPICAL TO DISCOURAGE PASSING AND TO PROVIDE AN ADDITIONAL ALERT THAT A CROSSWALK MAY EXIST AHEAD. ON TWO LANE URBAN STREETS, A SKIP YELLOW CENTERLINE MAY BE EITHER ADDED OR MADE SOLID AS WELL FOR THE SAME REASONS.

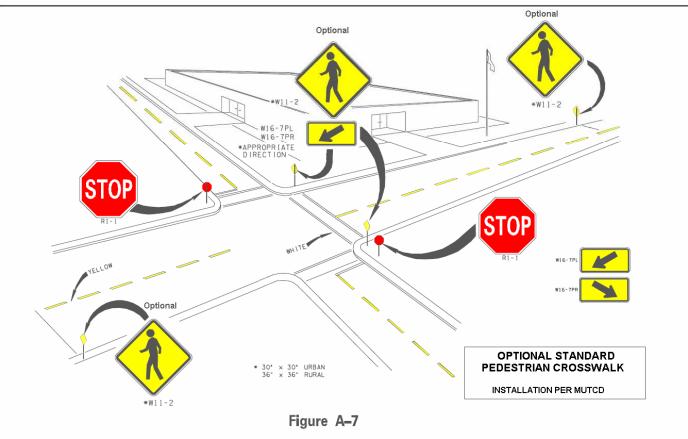
















## **Implementation Plans**

This section of the Framework provides a repository for current and past implementation plans prepared for the SR2S program.

An initial plan (dated May 2008) is provided on the following pages.

The Program Framework electronic media includes the 2008 SR2S Implementation Plan





# IMPLEMENTATION PLAN: PROJECTS, PRIORITIES, AND RESPONSIBILITIES

		Responsibility (■ Primary ■ Secondary)			Est. F	Eligible	
Project Name (Applicable Es)	Priority	City (Dept)	MUSD	Other	Cost (\$000s)	for SR2S Funding?	Project Notes/Description
Enhanced Vehicle Speed Control in School Zones (Engineering & Education)	High	(Devel Svcs)			75	Yes	Driver speed feedback signing in high-infraction areas or approaches; staged installation over multiple budget years possible
Shortened Duration of In-Street Portable School Zone Speed Signs on Arterial Streets (Engineering & Encouragement)	High		•		NA	NA	Shortened duration of speed zoning will promote driver adherence; may be combined with School Zone Signing/Striping Standardization and Enhanced Vehicle Speed Control projects for maximum effectiveness
Enforcement of School Zone Speeds, Signing, and Other Regulatory Issues (Enforcement)	High	(Police & Devel Svcs)			UK	Yes / No	Ongoing effort; example strategies are summarized in Section 4 of the Program Framework
Ongoing Assessment of Walking/Biking Activity and Community Attitudes (Evaluation)	High	•			2/yr	No	Quarterly in-class and biannual parent surveys provide measures of success and community attitudes over time
Engineering Study Updates (Engineering)	High	(Devel Svcs)			5	Yes	Biannual engineering reviews of each school site ensure compliance with standards/recommended practices
School Zone Signing/Striping Standardization (Engineering)	Medium	(Devel Svcs)	•		25	Yes	See "Proposed Signing & Striping" recommendations for each school in the February 2008 Engineering Study; includes yellow school crosswalks and high-reflectivity yellow-green signing and post covers; schools may be staged to spread expenditure over more than one budget year
Extended Walk/Bike to School Boundary at Santa Cruz Elementary (Engineering & Encouragement)	Medium	(Devel Svcs)			3.5	Yes	Additional signing, pavement markings, and crossing guard at Honeycutt/Road/Terragona Boulevard; replaces some existing bus transport south of Honeycutt Road
Bicycle Storage Facilities at Santa Cruz Elementary (Encouragement)	Medium				10	Yes	Lack of storage facilities at this location limits student bicycling and inappropriate storage of those bicycles that are ridden to school
Walking/Bicycling Educational Programs and Events (Education)	Medium	(Comm Svcs & Police)	•	•	UK	Yes	Ongoing effort; may be combined with other city/regional events/festivals; example activities are summarized in Section 4 of the <i>Program Framework</i> ; potential sponsorship by local service organizations or businesses







# IMPLEMENTATION PLAN: PROJECTS, PRIORITIES, AND RESPONSIBILITIES

Project Name (Applicable Es)	Priority	Responsibility (■ Primary ■ Secondary)			Est.	Eligible	
		City (Dept)	MUSD	Other	Cost (\$000s)	for SR2S Funding?	Project Notes/Description
Walking/Bicycling Encouragement Programs/Events (Encouragement)	Medium	(Comm Svcs & Police)			UK	Yes	Ongoing effort; may be combined with other city/regional events/festivals; example activities are summarized in Section 4 of the <i>Program Framework</i> ; potential sponsorship by local service organizations or businesses
Expanded Bicycle Storage Facilities at all MUSD Schools (Encouragement)	Low		•		20	Yes	Provision of safe and sufficient storage areas is critical to encouraging bicycling to/from school
Additional Bicycle/Pedestrian Access to Maricopa Wells Middle School (Encouragement)	Low		•		UK	Yes	Additional access along the eastern property line provides a shorter bicycle/pedestrian commute to/from the residential neighborhoods to the east and southeast; to reduce security concerns, consider access at this location only during short periods of time coincident with arrival and dismissal times
NA = Not Applicable	UK = Unk	nown	Devel Svcs	= Developm	ent Service	es Department	Comm Svcs = Community Services Department









## **Planning for the Future**

As the City of Maricopa continues to grow and the Maricopa Unified School District (MUSD) adds more schools, particular attention should be afforded the site selection and layout relative to their impacts on walking and biking safety.

Of particular importance are:

- Effective student pick-up and drop-off operations
- Site location and layout considerations

#### Student Pick-up and Drop-off<sup>1</sup>

The purpose of a SR2S program is to encourage and enable more children to walk and bicycle to school safely. Communities tailor a combination of engineering, enforcement, education and encouragement strategies to address the specific needs of their schools. This includes the walk or bicycle journey to and from school as well as the drop-off and pick-up process of children at school who are transported by motor vehicle. The drop-off and pick-up process must be safe and efficient for students and parents arriving by bus or private motor vehicle, as well as those who arrive on foot and bicycle.

Some parents are reluctant to allow their children to walk or bicycle to school due to the traffic congestion and perceived traffic danger during student arrival and dismissal. This often results in more parents driving their children to school which adds to the extra congestion and safety problems at the school, creating an increasing cycle of more traffic problems and less walking. By improving the drop-off and pick-up process, traffic conditions become safer for all, including pedestrians and bicyclists. Better organized and safer traffic conditions will ease the concerns of parents, and make them more willing to allow their children to walk or bicycle.

This chapter will help readers identify problems associated with the drop off and pick up of students at school, and identify engineering, enforcement, education and encouragement solutions to these problems. The purpose of improving the drop-off and pick-up process is to increase the safety and attractiveness of traveling to and from school on foot or by

<sup>&</sup>lt;sup>1</sup> Safe Routes to School Guide, developed by the Pedestrian and Bicycle Information Center (PBIC) with support from the National Highway Traffic Safety Administration (NHTSA), Federal Highway Administration (FHWA), Centers for Disease Control and Prevention (CDC) and Institute of Transportation Engineers (ITE); February 2007.



The information contained in this section expands upon the discussion that was included earlier in The Five Es section of the Framework.

bicycle. The drop-off and pick-up process, as with all components of a SR2S program, requires coordination with local government officials, law enforcement, school officials, parents and the general public.

Improving the drop-off and pick-up process will:

- Increase safety for everyone in route to and from school, as well as on school grounds.
- Employ engineering, enforcement, education and encouragement strategies.
- Require a site-specific application of strategies; each school will have its own set of limitations and opportunities.

Numerous tools can be used to improve the safety and efficiency of the drop-off and pick-up process at schools including:

- Encouraging walking, bicycling and carpooling.
- Curb striping and other pavement markings.
- Signage.
- Separating motor vehicles from pedestrians and bicyclists.
- Adding a drop-off and pick-up lane.
- Assistants to help students exit and enter motor vehicles.
- Adding an off-site queuing lane.
- Temporary street closures and one-way streets.
- Temporary use of school grounds as a drop-off and pick-up zone.
- Education, including maps and frequent reminders using school announcements and newsletters.
- Monitoring and enforcement of drop-off and pick-up policies.

#### Encouraging Walking, Bicycling and Carpooling

Naturally, a SR2S Program encourages students to bicycle and walk to school. But, some students simply live too far from their school to walk or bicycle, and are not provided with bus service. For those parents who must drive their children to school, several strategies can reduce traffic congestion at the school and in the adjacent streets, including park and walk and carpool programs. A

#### **Encouraging**

#### What is it and how does it work?

Urge students and parents to walk and bicycle to school, and when not possible, to ride the bus or carpool.

#### Benefits strategy provides

Decrease traffic at school.

Reduce vehicle emissions.

Increase physical activity levels.

#### Key factors to consider

Develop encouragement activities to reflect specific situation at each school and within each community.



park and walk program makes use of an off-site location (such as a nearby church or park) as a parking area for parents who then walk their child to school or join a regularly scheduled walking school bus to complete their journey. The Encouragement chapter of this guide describes park and walk and walking school bus programs in detail.

Families that have no alternative to driving their children to school can also carpool to reduce traffic congestion at the school.

Many larger metropolitan areas around the nation have free programs that assist people with forming carpools. These programs are now extending their reach to include school related trips. The school pool program, for example, is a service that provides "matchlists" to parents with students attending the same school so that students may carpool, walk or bicycle together. In some cases, participating schools provide student rosters containing names, addresses and phone numbers to the agency, which then provides the computer matching. In other cases, parents sign up individually and are matched with parents at the same school. After parents receive a matchlist of other parents it is up to them to make the arrangements they prefer.

Walking school buses and bicycle trains can be loosely structured or highly organized. For example, walking buses or bicycle trains can be as simple as neighborhood families deciding to walk or bicycle together. More formal, organized walking school buses and bicycle have a coordinator who recruits volunteers and participants, creates a schedule and designs a walking route. While requiring more effort, more structured walking school buses and bicycle trains offer the opportunity to involve more children.

#### **Curb Striping and Other Pavement Markings**

Curb striping or painting is used in drop-off and pick-up zones to clarify parking and other curb use rules. The color painted on curbs means:

White (or no color). Parking allowed, unless restricted by signs.

**Blue.** Parking for the disabled only. Drivers must have a disabled person parking placard (typically hanging on the rear view mirror) or disabled person or disabled veteran license plate.

**Green.** Parking allowed for a short time. The time is usually shown on a sign next to the green zone, or it may be painted on the curb. Green curb can also be used for student loading zones if accompanied by the appropriate signs.

**Yellow.** Stop only long enough to load or unload passengers. Drivers are usually required to stay with their vehicle.



# What is it and how does it work?

Delineate zones and intended use with paint.

Benefits strategy provides

Low cost.

Provides continuous explanation of zone.

#### **Key factors to consider**

Maintain paint.

Use standard colors.

Educate parents and students on proper use.

Use in conjunction with signing to clarify purpose.



**Red.** No parking. Red curb may also be used in NO STOPPING or NO STANDING zones in conjunction with the appropriate signs. A bus may stop at a red zone marked for buses. Red is also used to designate fire lanes at schools.

In some cases it may be helpful to stripe out the loading area, both for the driver and for the waiting students. Some schools stripe the path the drivers are supposed to use for drop off and pick up, and some schools use pavement arrows and pavement stencils to designate circulation patterns and where loading is to occur.

#### Signs

Signs help define areas in drop-off and pick-up zones and explain their proper use. Signs should be standard, highly visible, properly installed and well-maintained.

Some signs can be confusing if improperly placed or poorly worded. Signs with fewer words are easier to read and understand. Standard signs should be used on school property and in the surrounding area for regulating and guiding traffic. A local traffic engineer can recommend appropriate signs and their placement. See the Engineering chapter for more information on signing.

#### **Separating Motor Vehicles From Pedestrians and Bicyclists**

Separating or eliminating conflicts between students arriving on foot or bicycle from those arriving by buses and motor vehicles is highly recommended. Adequate physical space should be provided for each mode by which students arrive at school. Also, the route provided for each mode should be separate from other modes. Provision of sidewalks and bikeways that are separate from lanes dedicated to buses and lanes dedicated to motor vehicles will reduce a student's exposure to traffic. Students walking or riding to school should not have to cross busy driveways or roadways to access the campus. If they do, an adult school crossing guard or older student should be placed at the crossing to assist students safely across.

It may be appropriate to provide a separate travel lane for buses, a separate lane for private motor vehicles and specific routes for pedestrians and bicyclists. Separate bus zones can be established either on the school site, or on the adjacent street, wherever sufficient room exists. Preferably, the bus zone is not immediately adjacent to the private motor vehicle area to ensure that there is no spillover from the motor vehicles into the bus area.

A separation of arrival and departure times may also be useful. Staggered bell times for groups of students help to disperse the traffic peak at schools during the relatively short drop-off and pick-up periods. Staggered release

#### Signs

# What is it and how does it

Clearly indicates intended use of zone.

#### Benefits strategy provides

Low cost.

Provides continuous explanation of zone.

#### Key factors to consider

Use standard signs.

Install signs properly.

Maintain signs.

#### **Separating Motor Vehicles**

# What is it and how does it work?

Provide different school access points in space or time for various student travel modes.

#### Benefits strategy provides

Provide efficient and safe flow of all modes with minimal mixing.

#### Key factors to consider

Can be costly if construction is needed.

New schools and rebuilt or modernized schools should be carefully reviewed to ensure that separation is present.



or bell times for walkers and bicyclists, and bus riders and carpoolers can help reduce pedestrian or bicyclist exposure to, and minimize conflicts with, motor vehicles. Conflicts often occur when private motor vehicles and buses arrive at the same time and in the same location. For example, buses may use a drop-off and pick-up lane at a certain time, followed by private motor vehicle use at a later time. Staggered bell times are most applicable for schools with a large student population or when two or more schools are in close proximity to one another.

To further reduce conflicts, school facilities can be arranged to eliminate or reduce the number of children walking through parking lots. Children should walk around parking lots on dedicated walkways or sidewalks. If this is not possible, clearly marked walkways through parking lots with adult or older student monitors should be used, and speed calming treatments, such as humps or bumps, should be employed in the parking lots.

School bus loading areas should be separated from parent drop-off and pick-up areas if at all possible. Signs, pavement markings, gates or orange cones may be used to provide this separation, but some education and enforcement will also be needed.

#### **Drop-off and Pick-up Lane**

A drop-off and pick-up lane is an area on a street adjacent to school grounds or directly on the school grounds that is dedicated to the loading and unloading of students by private motor vehicles.

This school created a drop-off and pick-up lane on the street adjacent to school grounds. The picture to the left shows a corral where children wait to be picked up. Motor vehicles with identification tags that correspond to an individual student line up in the yellow-lined area. When the motor vehicle progresses to the white-striped loading area, the appropriate child exits or enters the vehicle. Signs, such as the one in the picture to the right, can remind drivers to follow the established process.

An on-site drop-off and pick-up lane can employ the same general technique as in the on-street drop-off and pick-up lane. The system illustrated in the pictures to the right uses two lanes rather than one, and the lanes are actually on school grounds. Several motor vehicles in one lane progress to the unloading zone, release the children simultaneously and move out when all the

### On-street and On-site Drop-off and Pick-up Lane

#### What is it and how does it work?

A lane designated for drop off and pick up of students from private motor vehicles only.

May be on school grounds or on street adjacent to school.

#### Benefits strategy provides

Speeds up and provides order to the drop-off and pick-up process.

#### Key factors to consider

Clearly delineate zone and define process.

The student loading area should be at the far end of the lane to maximize vehicle storage. In some cases two storage lanes may be used.

Unload or load three or four motor vehicles at a time.

Do not create a process that negatively impacts students arriving on foot or bicycle, and do not encourage more parents to drive students to school.



children have cleared the street. The next group of motor vehicles moves into the loading zone from the other line of queued vehicles and repeats the process. Curb striping delineates the areas, signs further explain their proper use, orange cones mark the lanes and school personnel orchestrate the entire process.

#### Assistants to Help Students In and Out of Vehicles

Providing curb-side assistants in drop-off and pick-up zones to help students exit and enter motor vehicles can provide order to the process and decrease its time.

Parents, school personnel, safety patrol or older students can serve as valets and open curb-side doors for students to enter and exit motor vehicles and remove bags or other items. This speeds up the drop-off and pick-up process by eliminating the need for the parents to get out of the vehicle and ensures students are directly accessing designated locations. These assistants should wear safety vests or belts, and the loading area should be designated by signs or paint and be located at the far end of the lane. It is best to have enough assistants to help load three or four vehicles at a time to speed up the process in a safe manner.

#### Off-site Queuing Lane

Another strategy to improve the safety and efficiency of the drop-off and pick-up process is the use of off-site queuing lanes.

The street in this photograph is a major collector. During arrival and departure of students, the right lane is marked no parking and the motor vehicles line up for drop off and pick up. As students are loaded or unloaded from the motor vehicles at the drop-off and pick-up zone the vehicles in the queue advance. Off-site queuing lanes, in conjunction with drop-off and pick-up lanes and assistants to help students enter and exit motor vehicles, can speed up and improve the safety of the loading and unloading process.

In some instances, striping a center turn lane on a collector street can provide a queuing area for left-turning drivers waiting to enter the school drop-off and pick-up area, without blocking other traffic using the street.

### **Assistants to Help Students**

#### What is it and how does it work?

Person opens and closes curb-side motor vehicle door for students entering and exiting vehicles. Parents stay in vehicle and leave immediately after the child exits.

#### Benefits strategy provides

Speeds up drop-off and pick-up process.

Channels students directly from motor vehicle to pedestrian zone or from pedestrian zone to motor vehicle.

#### Key factors to consider

Parents, school personnel and safety patrol can all participate.

Need to educate parents and children on the process.

Assistants should wear safety belts or bright vests.

#### **Off-Site Queuing**

#### What is it and how does it work?

Orderly line of vehicles on street adjacent to school waiting to pull into the drop-off and pick-up zone.

Benefits strategy provides

Reduces conflict with non-school traffic.

Speeds up and provides order to the drop-off and pick-up process.

#### Key factors to consider

Clearly delineate queue.

Do not block non-school traffic with queue.

Does the public right-of-way provide sufficient space for the vehicles, or does the needed width infringe on private property?

Do not extend the motor vehicle queue through a student crosswalk.





#### **Temporary Street Closures and One-way Streets**

Temporary street closures during student arrival and departure times can improve the efficiency and safety of the drop off and pick up of students at school. Temporary street closures eliminate motor vehicles in areas congested with pedestrians, bicyclists and perhaps buses. Another similar technique is to designate a street as one-way during drop-off and pick-up times. Signs are essential for this method.

Both temporary street closures and temporary use of one-way streets can work well in densely developed neighborhood schools. Any proposed street closures must be approved by the appropriate local transportation agency and must be coordinated closely with neighbors. It is also important to ensure that employing either of these techniques does not create traffic problems on other streets. Remember

that all of these techniques should improve the safety of the overall process, and not simply relocate the chaos.

#### Temporary Use of School Grounds as a Drop-off and Pick-up Zone

A section of the school grounds, such as a play area or parking lot, can be used as a dedicated drop-off and pick-up zone only when children are arriving at, or leaving, school. Temporary drop-off and pick-up zones can be useful in older, urban schools that were built without student loading areas when most children walked to school rather than being driven to school.

Some schools have received permission from their fire department or fire marshal to use a gated fire lane that encircles the school building as a parent pick-up and drop-off zone. This use requires parents to always stay in their vehicle, and to use a circulation pattern so that students load on the building side of the vehicle. At other times this area is closed to motor vehicle traffic.

#### **Education**

Educating parents and students on proper drop-off and pick-up procedure is essential in developing a safe and efficient system.

Regular reminders of drop-off and pick-up procedure from school officials to students and parents is one way to keep parents informed. Information provided to parents should be clearly stated, provide consistent messages and be delivered regularly throughout the school year. Maps of the dropoff and pick-up area with traffic flow patterns are very helpful. It is often

#### **Temporary Street Closures and One-Way Streets**

#### What is it and how does it work?

Officially close street to traffic, or create a one-way street only during drop-off and pick-up times.

#### Benefits strategy provides

Decreases traffic and chaos at drop-off and pick-up times with minimal cost.

#### Key factors to consider

Coordination with local government and adjacent property owners is necessary.

School officials may have to place and remove barricades and maintain them during the street closure.

Do not relocate traffic problems to adjacent neighborhood streets by employing this strategy.

#### Temporary Use of School **Grounds for Pick-up and Drop-off**

#### What is it and how does it work?

Use school play area, parking lot or other area as a drop-off and pick-up zone.

#### Benefits strategy provides

Provides a separate space for drop-off and pick-up by motor vehicle.

#### Key factors to consider

Useful in schools in densely developed areas with space constraints.

Education of parents and students is important.

Need good sign and paint plan; cones may be helpful.

To use a fire lane as a drop-off or pick-up zone, schools need to obtain approval from the fire department beforehand.



good to begin a new drop-off plan at the start of a new school year or after a break, and after sufficient notice has been given to parents and students about the new plan.

Some schools hold traffic safety days to provide students and parents with useful information. Drivers are reminded of traffic safety principles and school drop-off and pick-up policies and processes. At this time children can be recognized and rewarded for walking or bicycling to school. Drivers who are not following proper process can receive warnings from school personnel, parents or law enforcement officers. Giving small rewards, such as stickers or pencils, to students whose parents follow proper process may be more beneficial in correcting bad habits than punishing poorly behaved parents. Communities with a large non-English speaking population may benefit from multi-lingual educational literature, parking lot monitors and events.

### Monitoring and Enforcement of Drop-off and Pick-up Policies

Enforcement of drop-off and pick-up rules is essential in creating a safe drop-off and pick-up environment. Enforcement as it applies to the entire Safe Routes to School program is discussed in detail in the Enforcement chapter, so it will be mentioned just briefly here.

Enforcement of drop-off and pick-up policies and process can be performed by a variety of people. Schools around the country have had success utilizing law enforcement officers, school personnel or parent volunteers. When new drop-off and pick-up plans are implemented assistance may be requested from law enforcement officers to make sure traffic flows smoothly during the first few days. Implementing a new plan may also require more volunteers or monitors to regulate parent activity in the first few days.

#### **Monitoring and Enforcement**

#### What is it and how does it work?

Inform and remind the school community of drop-off and pick-up policies and process.

#### Benefits strategy provides

May be the only additional activity necessary to keep drop-off and pick-up safe and efficient.

#### Key factors to consider

Regular reminders and consistent application of rules are necessary.

Reward students if their parents follow the process.

Police assistance may be requested when implementing a new plan.

## School Site Location and Layout<sup>2</sup>

Road user safety in and around school areas is a highly sensitive subject among the public, school officials and local officials. Many of the traffic problems at schools are related to the lack of good guidelines for selecting optimal sites where schools are to be built; improper design of the school campus; and poor connectivity to the neighborhood the school serves.

<sup>&</sup>lt;sup>2</sup> ITE Technical Committee TENC-105-01: School Site Planning, Design and Transportation, ITE Journal, September 2007.



The Institute of Transportation Engineers (ITE) recognized this problem and established a technical committee to address it. This feature provides a summary of the activities of ITE Technical Committee TENC-105-01 to identify desirable or recommended practices for school site planning, design and transportation facilities.

The goal of the ITE Technical Committee is to develop a set of guidelines that can be used by local agencies, school officials, developers and others to identify and provide safe and highly functional school sites; provide guidelines on the layout of school campuses and street systems adjacent to schools; and provide adequate sidewalk/bikeway connections to maximize the ability of students to walk or ride their bikes to school.

The guidelines will primarily focus on conventional public schools, especially elementary and middle schools (kindergarten to eighth grade), but they also will contain information for high schools, charter schools and parochial/private schools. A major emphasis will be on the site selection and design of new elementary schools for maximum walkability, safety and efficiency.

Information also will be provided for the redevelopment of existing school sites for greater walkability and safety and improved traffic efficiency. The guidelines are intended to be used by school administrators and school board representatives, developers, land use planners, architects, transportation planners, transportation engineers and state/provincial and local politicians.

ITE Technical Committee TENC- 105-01 intends to complete compiling a series of guidelines and best practices in 2007 and will submit these guidelines to ITE, practitioners and school officials for review and input. While the final release will not occur until sometime later in 2008, the committee has identified a number of key issues associated with school site selection and design:

A number of factors have led to the reduction in walking and the increased congestion and traffic problems at schools. Some problems are created by schools established long ago at poor locations requiring students to cross busy streets. Some factors are related to local ordinance requirements that had good intentions but resulted in unintended negative consequences. Other problems result from the desire to reduce the cost of purchasing land and building new schools.

Low-cost location, design and construction of a school with inadequate infrastructure can result in a lifetime of higher costs for traffic control or busing to overcome built-in traffic safety and operational problems. Because schools will be in service for many years, it is important to





understand how a school will operate with respect to the adjacent community and roadway system.

Specific issues that result in decreased walking/bicycling and added traffic problems include:

#### Increased school size

Years ago, typical elementary schools were smaller, with an average population of 127 students. Today, the average size of a school is 653 students, and elementary schools of 800 to 1,000 students are not uncommon. Larger school populations typically mean larger attendance boundaries with longer walking distances, which discourages walking and creates traffic problems.

#### Increased school campus size requirements

Some agencies, through zoning ordinances, are requiring larger school campus sizes, forcing school officials to select poor sites and locate the school campus farther away from the neighborhoods they serve. <u>Smaller school sizes should result in a smaller school campus, providing more options for the location of the school.</u>

#### School placement within the attendance boundary

Schools should be located in the center of the attendance boundary to minimize walking distances, and elementary schools should not front onto busy arterial streets. Furthermore, young children should not have to cross busy, high-speed arterial streets to walk to school. High schools, on the other hand, are typically more appropriate for arterial street locations due to the higher traffic levels generated by these schools.

Access to the school campus should occur from more than one driveway, and major driveways should be carefully located to avoid left-turn conflicts with driveways and intersections on the opposite side of the street. Major school driveways on arterial streets should be located at potential traffic signal points to allow for possible traffic signal control.

#### Traffic circulation and connectivity within the neighborhood

Schools should not be located at the ends of cul-de-sacs and should have vehicle access from at least two different streets, preferably more. More points of access will result in less congestion and more efficient traffic dispersion. Pedestrian and bike access should occur from all points around the school, and walking distances should be minimized. Neighborhoods with cul-de-sacs and minimal connectivity will provide poor pedestrian/bike access to schools and minimize walking.



A grid neighborhood layout will provide the best connectivity between the school and the community it serves, allowing more children to walk or bike to school.

#### Lack of sidewalks

Paths and sidewalks are "highways" for pedestrians. All-weather paved walkways and sidewalks are needed to provide pedestrians a safe place to walk and will encourage parents to allow their children to walk to school. Wider sidewalks are needed at or near school grounds, and there should be adequate connections from the sidewalks to the school buildings with minimal driveway crossings. In addition, street crossings need to be evaluated for appropriate traffic control. Adult crossing guards may be needed where young children cross busy streets to provide for optimal safety and efficiency.

#### Inadequate pick-up and drop-off areas for school buses and parents

Separate pick-up/drop-off areas should be provided for school buses and for parents. Pick-up/drop-off plans should be implemented for efficient operation and to minimize traffic congestion and back-up on the adjacent street system. Ample queuing areas are needed on the school campus or along the school so that pick-up and drop-off will not disrupt flow in the adjacent streets.

#### Inadequate curb space

<u>Schools should not front onto a single street</u>, which will focus all of the traffic into one small area and minimize available room for parking and pick-up/drop-off activities. Schools should front onto at least two streets and, preferably, more.

#### Inadequate parking

Schools need ample parking for staff, parents and other visitors and to discourage parking intrusion into adjacent neighborhoods. High schools should provide ample on-campus parking for students and discourage as many students as possible from driving to school. Parking also must accommodate other school activities such as parent-teacher conferences, open houses, sporting events and concerts.

#### Parent attitudes

Concerns about child abductions (which are largely unfounded), adverse weather conditions, or road user safety often discourage parents from allowing their children to walk or bike to school, adding to the traffic congestion at school arrival and dismissal times.





#### School security concerns

Security concerns often result in closed campuses with very few access points. Fewer access points often create more congestion at the remaining access points and longer walking distances, which discourages walking. There needs to be a balance between campus security and school access. Remote campus access points can be allowed during school arrival and dismissal but may be locked during other times.





## **Additional Information**

#### Resources

As SR2S programs have become more important and prevalent, the number of resources available has increased.

## National Center for Safe Routes to School

http://www.saferoutesinfo.org/index.cfm

The National Center for Safe Routes to School aims to assist these communities in developing successful Safe Routes programs and strategies. The Center offers a centralized resource of information on how to start and sustain a Safe Routes to School program, case studies of successful programs as well as many other resources for training and technical assistance. These extensive resources can be found at:

NCSR2S Resources SR2S Online Library

Arizona Department of Transportation Safe Routes to School <a href="http://tpd.azdot.gov/planning/SR2S\_index.php">http://tpd.azdot.gov/planning/SR2S\_index.php</a>

Traffic Safety for School Areas Guidelines

National Highway Traffic Safety Administration SR2S Toolkit

http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/Safe-Routes-2002/toc.html

This toolkit has been designed to assist in initiating and implementing a SR2S program.

National Highway Traffic Safety Administration Bicycle Program http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.810acaee50c651189ca8e41 0dba046a0/

Through education, enforcement, outreach and legislation, NHTSA's bicycle safety program goals are directed toward reducing bicycle injuries and fatalities. Bicycling is encouraged as an alternate mode of transportation to motor vehicle travel.

**Bikeability Checklist** 

Kids and Bicycle Safety

Kids and Bicycle Safety - (Spanish)

Easy Steps for Fitting a Bicycle Helmet

Easy Steps for Fitting a Bicycle Helmet - (Spanish)

Prevent Bicycle Crashes: Parents and Caregivers

Seven Smart Routes to Bicycle Safety





## Centers for Disease Control – Kids Walk-to-School

http://www.cdc.gov/nccdphp/dnpa/kidswalk/

To support the national goal of better health through physical activity, CDC's Nutrition and Physical Activity Program has developed Kids Walk-to-School. This is a community-based program that aims to increase opportunities for daily physical activity by encouraging children to walk to and from school in groups accompanied by adults. The CDC website offers extensive resources for use in local community programs:

Walking and Bicycling to School: Community Presentation and Lesson Plan, Presenter's Guide, and Presentation Script

<u>Train the Trainer</u> and <u>Lesson Plan, Presenter's Guide, and Presentation Script</u>

Walk to School Programs—Fact Sheet

Kids Walk-To-School: A Guide to Promote Walking to School

Walk-to-School Programs Quick Start Resource

Federal Highway Administration Safe Routes to School <a href="http://safety.fhwa.dot.gov/saferoutes/">http://safety.fhwa.dot.gov/saferoutes/</a>

<u>Safe Routes to School: Practice and Promise</u>
<u>National Transportation Enhancements Clearinghouse</u>

Pedestrian and Bicycle Information Center <a href="http://www.pedbikeinfo.org/">http://www.pedbikeinfo.org/</a>

International Walk to School in the USA <a href="http://www.walktoschool-usa.org/">http://www.walktoschool-usa.org/</a>







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